

DTIC Subject Categorization Study

Part I: SCG Uses and Suggested Field Changes

Part II: Subject Categorization Methodology

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A DTIC-O Study Project (Revised Apr 1998)

James Adkins

Final Copy

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I find that the ensuing discussions seem to reside in two groups. One group, more conservative, wants very little change and strictly controlled subject categories with controlled indexing terminology. The other larger group seems to want more fields and groups with a significant increase in index terms.

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INTRODUCTION

The Defense Technical Information Center (DTIC) is a major component of the DoD Scientific and Technical Information Program. It is the central point within the Department of Defense (DoD) for acquiring, storing, retrieving, and disseminating scientific and technical information (STI) to support the management and conduct of DoD research, development, engineering, acquisition planning, and studies programs. DTIC contributes by providing access to and transfer of scientific and technical information for DoD personnel, DoD contractors or potential contractors, and other U.S. Government agencies and their contractors. In 1998 DTIC began operating within the Defense Information Systems Agency (DISA). DTIC's mission remains unchanged.

Because of the need to categorize new areas (Fields) of scientific and technical interest DTIC replaced the COSATI Subject Category List (DoD-Modified), October 1965, AD624000, with the revised Subject Categorization Guide For Defense Science and Technology dated October 1986, ADA172650. Classification and categorization objectives are synonymous in meaning for purposes of this study. This study proposes to revise and update the 1986 Subject Categorization Guide (SCG).

During the 1970s the Defense Documentation Center (DDC-DTIC's predecessor) evaluated possible ways of using natural languages with computerized databases to provide classification information from keyword phrases. From a list of noteworthy elements a phrase is constructed to tag the idea of the document subject matter.

There are also recent studies using a statistical approach where the subject category assignments are mainly based on the frequencies of words found in documents and on statistical calculations with those word frequencies. Both approaches require significant human post review and there is no existing successful track record involving application to large databases. There are reasons to believe that the programming cost of these alternatives would far outweigh their usefulness. All of this could change with the development of a highly efficient, low cost, off-the-shelf package program. However, lack of a successful program package reverts attention back to the DTIC SCG. Without doubt the SCG, after decades of usage, has demonstrated that it is a useful tool in providing, establishing, and maintaining standardization, convertibility and transferability of all types of DoD information. So a favorable consensus exist for revising and enhancing the present SCG.

Participating agencies working with the Committee on Scientific and Technical Information (COSATI) Council in 1966 included the National Technical Information Service (NTIS), the Department of Energy (DoE), the Department of Defense (DoD), and the National Aeronautics and Space Administration (NASA). These agencies laid much of the groundwork for the first SCG. Since that time the CENDI Consortium, which includes the original COSATI participants (CENDI Cataloging Working Group), has proposed and accepted cataloging standards and made recommendations supporting use of DTIC's SCG.

Presently, DTIC has moved into the national and international arena regarding bibliographic, cataloging, and indexing standards by working more closely with the International Council for Scientific and Technical Information (ICSTI), the National Federation of Abstracting and Information Services (NFAIS), the National Information Standards Organization (NISO), the information arm of the American National Standards Institute (ANSI), the International Organization for Standardization (ISO), the European Space Agency (ESA), the International Nuclear Information System (INIS), the NATO Advisory Group for Aerospace Research (AGARD), and many others.

In 1986, there was a need for establishing clearer lines of demarcation among new and emerging technologies with sensitive military applications. There was also a continuing need to provide the basis for subject grouping scientific and technical reports. These groupings(sub-categories) defined the areas of need-to-know to facilitate distribution of information about DoD-developed and DoD-supported technologies.

Index terms appearing in the DTIC Thesaurus also appear in the Subject Categorization Guide (SCG) under the various fields and groups. All of the needs described above persist today.

Since 1986 development and expansion of Internet, Intranets, and other LAN-based systems has promoted sophisticated indexing and retrieval software that has contributed to an explosive growth of automated and machine-aided indexing methods. These methods have virtually replaced analytical review functions by humans. Consequently, DTIC finds its thesaurus-based controlled vocabulary developed for human indexing now primarily used by computers. The demand for large computer-based thesauri has raised a number of fundamental questions. First, how should the thesaurus be constructed __by hand or automatically? Second, what kind of information should the thesaurus contain? Third, what should the design of the thesaurus be, that is, how should the contents be organized and made accessible to EDMS or internal servers? If the thesaurus is online in electronic format what should be the measure of control? How should the thesaurus-based recognition dictionary be constructed and maintained?

The SCG has been used primarily as a management and control tool by DTIC management to determine need-to-know and efficiently distribute information. But there are other uses. Many of them are considered in this study.

Summary

This study is presented in two parts. **Part I** is concerned with how the present Subject Categorization Guide is utilized and provides some recommendation for other uses. Changes are suggested on restructuring portions of the guide where existing terminology does not fully support categorization of a large segment of incoming documents. **Part II** reviews the methodology for change and the reasons for adopting the changes.

The Appendices presents a breakdown of three frequency distribution measurements: (1) the subject fields and groups as a percentage of the total Technical Reports database; (2) the document orders, by subject fields and groups, as a percentage of total document orders and the number of available documents; and (3) the classified portion of the database by fields and groups as a percentage of both the total classified and total database. Additional chart attachments provide a summary of these findings. The statistics are presented in 10-year increments from 1960 through 1997.

Some fields show enormous changes because of high interest or a lack of it over the 37-year period that was investigated while others remained stagnant with little activity. There are compelling reasons to meticulously examine the high growth fields to determine if the terminology is sufficient and appropriate. One is that new terms must be incorporated into the database to retrieve new and changing technical information. A dialogue must exist among the indexer, requester, and the system. They all must speak and be aware of the same terminology, and retrieval terminology should enter the database at the time the document is indexed, not two to five years later.

There are equally compelling reasons to examine fields and groups that have become stagnant or show little activity over decades of existence. Some of these fields have lost their significance because of advancement in research while others were merged or supplanted through technological innovations. These fields are no longer dominant areas for scientific investigations.

This study also provides information concerning what portions of the fields are classified and to what extent does classification stifle dissemination. The study targets fields whose classified portion is greater than 40% and compares them with fields whose classified portion is less than 10%. Each is then equated to the percentage of document orders for comparison. It was determined that classified documents were being disseminated at nearly the same rate as the unclassified if time is allowed for limited document processing. These facts speak well of the faith and trust the Defense Community has in the Defense Users Registration System (DURS), which pre-registers DTIC users according to a set of predetermined fields and groups.

Another reason for investigating the classified field structure is that DoD has been uncomfortable, for security reasons, with classified subject groupings exceeding 4% of the total database. **Navigation, Detection and Countermeasures, and Military Sciences**, are two fields that exceed the 4% DoD guidelines. Both fields contain approximately 50% classified documents.

The study of document orders in **Part I** gives some insight into which fields are popular, areas of sustained growth and possible areas for document procurement action. It makes sense for DTIC to concentrate its acquisition efforts in those fields where document popularity is the greatest. Some fields have consistently contributed to large orders over the entire period.

The study also focuses on several other areas of concern:

1. What are the dominant fields and/or groups and how is the activity in these fields changing over time and in which direction?
2. Is there a need to break-out or consolidate certain fields and groups?
3. Would these changes make a difference in accessing the database and improve the dialog with the system?
4. How would DTIC incorporate these changes into the present cataloging and indexing system and at what cost?
5. How will the proposed changes affect the users, DD 1540, and re-certification efforts? A discussion of these concerns are addressed in the section concerning justification for changes to the present fields.

The study also reviews the DTIC Contributors Guide on Technology Codes and provides some recommendations on correcting the deficiencies, standardizing the coding, scoping the fields, and establishing procedures and definitions.

Part II of the SCG review is more concerned with the methodology of change and reasons for adopting the changes. It is also concerned with information accessibility and communication. The SCG has become a technological tool: a means of information movement and management control. The indexing processes, MAI, vocabulary control, validation, document security and thesaurus management is inextricably bound to the SCG field and group terminology. The DTIC Thesaurus, primarily formulated for use by Indexers, is used as a thesaurus for databases searched by a computer. Significant changes have occurred based on the thesaurus application, and the automated posting of entry terms. How can these changes be handled and controlled without significant degradation of the indexing process? How are DTIC user being affected?

DTIC users are primarily interested in accessing the database and acquiring good information. They appreciate DTIC's indexing prowess, but the learning curve for communicating with the system is too high and is discouraging to most unfamiliar searchers. These users want their task made easier through computer graphic interfaces and

knowledge bases that tend to suggest other means of approaching the search question and acquiring needed data. They do not want the search engine to reject terms not part of the Inverted Files or Recognition Dictionary. But the Indexers are not entirely satisfied with the terminology either: they want more terms for indexing purposes.

This part of the study suggests several other areas where changes are needed:

1. Establish a hierarchically structured categorization system online to enable users to broaden or narrow searches at will,
2. Provide two distinct online thesauri: One for users, the other for indexers,
3. Incorporate thesauri from other organizations for Indexers online,
4. Incorporate all the generic terms into the categorization scheme,
5. Provide data support for intermingled research efforts, and
6. Provide data handling compatibility with international standards.

Finally, the SCG and all the ramifications of its strategic involvement with DTIC's information movement, management and control is presented through a strategy-formulation process called a **SWOT** analysis. This analysis considers DTIC's external Opportunities and Threats and align these against internal Strengths and Weaknesses to formulate feasible alternative strategies. The SCG is referenced through the total (strategic) DTIC effort and strength.

Part I: A. SCG Uses and Suggested Field Changes

A.1 SCG Review: Objective, Purpose, and Authorization

Objective:

Provide the steps needed to improve the scope, completeness, currency, accuracy and usefulness of DTIC's Subject Categorization Guide(SCG). This can be accomplished by providing significant changes to the structure, scope notes, and field/group content of the SCG.

Purpose:

Review SCG to determine areas needing expansion, improvement or revision that support the interests and needs of individuals and organizations connected to DTIC's mission. Provisions include measures that:

- 1.) Enhance present customer needs and interests by making DoD information more accessible.
- 2.) Provide for future customer needs and interests by adequately identifying and categorizing new and changing subject areas based on evolving mission requirements.
- 3.) Present and support terminology that is readily communicated or easily understood by all parties.

Authorization:

DTIC is responsible for providing DoD agencies and its contractors the necessary support and indexing terminology for effectively exchanging scientific and technical information to satisfy evolving mission requirements. This responsibility is relayed in DoD Instruction 3200.12:

DoD Instruction 3200.12 Rev 1996 "DoD Scientific and Technical Information Program." DTIC shall:

1. Provide centralized operation of DoD services for the acquisition, storage, retrieval, and dissemination of STI to support DoD research, development, engineering and studies programs.
2. Specifically, DTIC is responsible for providing or executing the following function in support of STIP:

Maintains a system of document acquisition, storage, announcement, reproduction, and distribution methods in accordance with DoD security policies, standards, criteria, and procedures for classified, limited distribution, export control and company proprietary information entrusted to the Department of Defense by agreement.

A.2 Subject Classification Guide Utilization

Requirement: Determine how and in what ways elements of the present SCG is being utilized by DTIC and others.

A.2.1 DoD Non-security functions

- a.) Sets up input categories for DTIC's Scientific and Technical areas,
- b.) Promotes domestic and foreign document announcement,
- c.) Helps generate Current Awareness Profiles,
- d.) Provides the basis for subject groupings of S&T reports,
- e.) Provides groupings for subject index terms appearing in the DTIC Thesaurus, (The subject fields and groups, as an aid to subject classifiers, provide the categories for subject index terms appearing in the DTIC thesaurus that are used for indexing the DTIC collections. There are presently 25 broad subject fields and 261 groups.)
- f.) Provides the basis for profiling and disseminating documents under the ADD program,
- g.) Provides information on definitions and scope notes that covers the subject groupings of each field.
- h.) **User Registration Systems**
F/G information residing in the Defense Users Registration System(DURS) facilitates actions needed to maintain management control over and accountability of DTIC products and services. DTIC receives, records, and maintains DoD authorizations to furnish information services and products to organizations and established individuals.
- i.) **Interrogation of search files**
Process of using search terms against F/G to determine documents that satisfy search criteria.
- j.) **Use of F/G in microfiche headers**
Use of F/G to identify microfiche targeted as part of the ADD Program.
- k.) **Statistical Summary Output Preparation**
A process that provides statistical information concerning file usage, document collection input,

document F/G frequency variations, Inventory files, history files, etc.

1.) Prior announcement and reference processes.

Prior to 1990 F/G appeared in announcement products such as TAB and it's indexes, catalog cards and other reference tools.

A.2.2 DoD Security Functions

Security at DTIC receives the highest priority that is accomplished through a complex and comprehensive security program. The recognition of the need for security permeates all aspects of DTIC's operations in order to safeguard the information it maintains against unauthorized release. User registration is only one part of the control process. Validation and release authority is built into the registration process in order to make STI available as expeditiously as possible. Changes in the registration process may cause re-certification of users and review of new fields by the monitoring activities in order to safeguard classified documents.

The Registration System:

- a.) Enables selective dissemination of information products by defining the areas of need-to-know,
- b.) Permits establishing access restrictions to more sensitive information,
- c.) Provides access verification through the Online Dissemination Authority List (ODAL), a mechanism for defining areas of need-to-know for document dissemination,
- d.) Provides the basis for user registration and validation by using the Defense Users Registration System(DURS), PCMUAC, and the DD1540 as the controlling instruments through:

Validation as the process of comparing requesters' authorization with F/G release criteria in DURS as applicable to requested products and services. Criteria include, as applicable, security classification, subject areas, need-to-know, provisions for payment, and the definition of the requester's access category in relation to any special release conditions. The outcome may result in rejection and a notice sent to the requester.

A.3 Other Proposed Uses of The Subject Classification Guide:

- 1. The SCG can establish separate field(s) and group(s) for non-subject terms or abstract terminology identified in DTIC's Thesaurus that has provided qualification or modification to subject terms.
- 2. The SCG is used as a mechanism for defining the areas of

need-to-know in the distribution of NATO technical information.

3. F/G could be utilized for large scale automated dissemination of primary distributed documents to organizations based on need-to-know.
4. The SCG field/group combination that make up the S&T codes associated with DTIC WUIS and IR&D databases can become the basis for restricting the MAI term selections.
5. SCG field/group codes are used in many announcement bulletins, document and product catalogs, handbooks, and instruction manuals other than at DTIC, and several foreign publications, i.e., NATO, Canadian, Australian and Netherlands literature reviews and thesauri.
6. The Online Dissemination Authority List (ODAL), which utilizes the SCG fields and groups to certify need to know access to classified information, is employed by a number of DoD organizations to facilitate the distribution of their controlled documents. The ODAL is used for both primary and secondary distribution access verification.
7. Since the SCG provides additional information on the definitions of the fields and groups, many other organizations use the DTIC field/group structure and associate it with their subject areas and need-to-know criteria, i.e., NASA and DOE.
8. The SCG should promote communicability of information. It should facilitate communication between the requester, indexer, retriever, and provider. All should speak the same language without benefit of further interpretation.
9. The SCG permits online access with input and modification features. ADP software support is desired for input and maintenance of SCG that specifically identifies each scope note, field and group, and provides online prompting, editing, and spell checking. This includes:
 - a) providing an intelligent Explorer or Road Map online to related terms that complies with ANSI/NISO standards,
 - b) terminology from other technical dictionaries,
 - c) field controlled computer aided associated terms,
 - d) use references as appropriate,
 - e) scope notes from drop menus on command, and
 - f) enhancement of indexing, MAI, and online display functions.

10. New Fields and Groups, along with their associated or added terminology, should be fully identified and highlighted to facilitate usage. Additionally, all new terminology should be readily understood and communicable across the entire user community.

B. Field and Group Frequency Distribution Study

B.1 Subject Fields and Groups Data Set Limitations

The statistical data presented in this paper was furnished by DTIC-Z through automated programs already developed or modified. Data generated before 1960 was not included and this excluded data could involve a document accumulation exceeding 600k or more. The basic statistical data was obtained from the individual subject fields and groups from 1960-1997. The field ratios show the changes occurring in the document flow and the document collection over the last 37 years. While it is true that the collection is viewed from the field and group perspective, the reviewer should keep in mind that the field/group to document conversion ratio is approximately 2.28 per document for the subject fields and groups and approximately 1.5 per document for the classified entries. It appears that the database collection addressed by this study contains approximately 1.0 million documents.

B.2 Analysis of Document Orders By Fields and Groups

The Document Order frequencies are obtained from the History Files matched with the fields and groups. This information creates summary statistics for what is of the most and least interest, and helps to establish guidelines for a proactive acquisition and distribution policy.

Field and group categories are being assigned to all DTIC documents upon entering the processing pipeline. Some of the Collection prior to 1960 does not contain fields and groups, and these documents are not included in the study. This study finds approximately 94% of the present document input is unclassified, and nearly 54% of the unclassified is public release documentation. This leaves approximately 40% that may be disseminated under field controlled distribution codes and an additional 6% under security control.

One consensus has portrayed the distribution and security limitation as preventing the maximum flow of information. Upon examining Field 17: Navigation, Detection and Countermeasures, which is 48% classified and 91% controlled, the data indicate that 30 times the aggregate field (154,652) has been ordered. It appears the time necessary to process the release limitations may be a major setback for classified and controlled distribution documents. This type of accessibility is compared to the Mathematical and Computer Sciences field where the field total in the aggregate amounts to nearly 40 times 143,098 field/documents, which is equal to 5,719,091 field orders. This field represents the highest document orders. This field also has a low percentage of controlled documents.

B.3 Analysis of Classified Field and Groups Data

All 25 fields and 95% of the groups contain some classified documents. Field 17: Navigation, Detection and Countermeasures contains the highest portion of classified documents at 48%. The field containing the lowest: Environmental Pollution and Control, has less than 1% classified. There were 341,466 classified field entries, approximately 15.3% of the database total.

B.4 Suggested Changes to the Subject Category Fields

Initiate or effect changes in the SCG to accommodate new and separate data areas and provide alternative mechanisms for entering and capturing the data elements. Provide the steps needed to improve the scope, completeness, currency, accuracy, and usefulness of the SCG.

The following recommendations and suggestions are made to improve the accessibility to DTIC documentation based on review of 37 years of statistical database information:

1. Field changes, merges, or modifications that are based, in part, on the analysis of the data as presented in the Subject Categories Field Ratio Chart are needed.
2. Document orders frequencies based on Field and Groups reviews suggest areas of document popularity and the need for subsequent acquisition activities.
3. Although classified data appears in every field and 95% of the groups, it does not appear to stifle dissemination.
4. User interviews and comments insist that DTIC terminology is out of step with ongoing research efforts. Some users say that DTIC speaks a different language than they and DTIC still uses many connotations common 30 years ago. Many also expressed difficulty in retrieving information concerning, acquisition reports, administrative directives, management and technology planning documents, and mission planning and requirements documents to name a few. Changes in the Subject Categories will effect changes in several other areas:

1. Customer Service
2. Revised Subject Fields
3. Term Anachronism
4. Improved Accessibility and Communicability
5. Distribution and Need-to-Know

B.4.1. Customer Service Survey.

Information from User Survey conducted in 1996 by DTIC-B and DTIC-E shows customers want changes in the Thesaurus to:

- a. provide for rapid acceptance of new terms,
- b. update the Thesaurus at least quarterly,
- c. set up more detail/specific terms in Thesaurus,

- d. assign all Thesaurus terms to appropriate subject fields,
- e. include more Identifiers-type terms in the Thesaurus, and
- f. set up a Microthesaurus of sub-language terms.

B.4.2. Revising Subject Fields.

An analysis of certain field statistical data over time is made through a number of DROLS searches. These searches show what other terminology is also connected with these fields and how much of this terminology appears outside of the prescribed field. These search results support splitting or merging certain subject fields. Some examples are: marriage of computer technology with semi-conducting technology and information handling technology. Another could be Radar with Electronics, Detection and Counter-detection.

B.4.3. Term Anachronism.

While studying index terms as applied by both MAI and the indexers, one will find there is a need to consider incorporating newer terms while deleting obsolete terms. The Thesaurus should reveal the date that the new or replacement term is established if the database contains the previous term as well as the newer term. The newer terms most acceptable to the information community should prevail throughout the thesaurus.

B.4.4 Accessibility and Communicability.

Although various other reasons were considered as influencing the direction of research and the changes that occurred in the document collection, they were beyond this effort. The major concern of this research is whether or not the subject categories are sufficient to accommodate present and future DTIC users' needs of improving accessibility and communicability of DoD information. One major concern is that DTIC's DROLS cannot provide equal search access to all three databases simultaneously.

B.4.5 Distribution and Need-to-Know

While considering improvements in access and communication, it was noted that changes in the categorization scheme and subject categories may cause changes to some of the ways in which SCG is being utilized. If these changes are numerous they will necessitate a review of the monitoring organization's policies and procedures that concerns distribution limitations or need-to-know. Because of the proposed new fields, searches or profiles-based products that are contingent on fields and groups may need to be reviewed and restructured. Changes will also occur in the DD 1540 that may require re-certification of users. And all of this may require approval of OSD.

Perhaps DTIC-Z should consider whether some other means can be employed to control the distribution of limited documents instead of by subject category fields and groups. However,

the validation process requiring field/group access limitations appears to be working smoothly and does not require fixing.

C. Proposed Subject Category Changes

Not everyone will agree with the proposed changes given in this study, but they do offer a myriad of excellent alternatives in which to start the process of change and revision. The need for corporate direction and strategic philosophy was never more urgent than it is today.

Why Change is Needed

The greatest changes occurring in DoD at this time is in the acquisition workforce. In the near term, certain actions will be taken to accelerate the movement to the new workforce vision. A great deal of restructuring, reengineering, and re-focusing needs to be accomplished in order to provide the best possible support for the warfighter. Activities organized along functional lines will become organized along product and service lines. This will cause DoD personnel to become more involved with activities such as financial management and contracting rather than with broad functional organizations like maintenance and distribution. Significant progress in educating the acquisition workforce has already been accomplished under the Defense Acquisition Workforce Improvement Act (DAWIA). Future requirements will intensify the need to maintain information service access online in real time.

In order to facilitate training provisions the Defense Acquisition University (DAU) has established 81 courses with over 1200 offerings in educating approximately 35,000 workforce members annually. Communicating with this acquisition workforce in aiding their request for information should be a major DTIC concern. Needed terminology for acquisition data retrieval should already be a part of DTIC's Thesaurus structure.

DTIC is presently fully equipped to handle, but unprepared to intellectually transfer information technology to aid DoD efforts to improve responsiveness, reduce inventories, or make technical information assistance quickly and easily available. Failure to provide adequate subject categorization and perform thesaurus structure and maintenance tasks will erode the ability to intellectually respond in critical situations. Included in Appendix 5 is a list of mostly acquisition technology terms DTIC should consider including in its Thesaurus structure. Incorporating these types of terms will help tremendously in retrieving acquisition reports. There are many others not listed so the list should remain active.

The proposed subject category changes are also submitted in chart form and are attached to this document as Appendix #4. But keep in mind these changes are submitted only as guides and need not deter one from the final objective.....a viable, mission encompassing subject categorization scheme.

C.1 Category Listings

<u>Category</u>	<u>Field</u>	<u>Database</u>	<u>Totals (%)</u>	<u>Create/Change/Merge</u>
Agriculture	2	9,318	0.4%	Merge w/ Fld 8
Astronomy & Astrophysics	3	11,253	0.5%	Merge w/Fld 20 Merge w/ Fld 22
Atmospheric Sciences	4	35,975	1.6%	Ocean Sciences Merge w/ Oceanography
Behavior & Social Sciences	5	149,989	6.7%	Expand Behavior Sci Chg to Social Sci and Psychology Add Humanities & Hist Add Sociology & Law Add Gov't & Political Science
Military Sciences and Technology (Revised)	15	157,928	7.1%	Incl Mission Areas Mission Plans Military Technologies Functional Analysis
Management Sciences & Technology (New Field)				(See Scope Notes Below) Establish Mgt Sci Fld Add Pers Mgt & Labor Rel Add Econ & Cost Data
Information Science (New Allied Field)				Allied W/ Computer Science Add Linguistics Add Information Resources Add Information Technology ADD Information Management
Earth Sciences And Oceanography (Revise Field)	8	164,951	7.3%	Add Agriculture Remove Oceanography and Add to Atmospheric Sci
Atmospheric Sciences & Oceanography) (Combined)				Add Meteorology Combined with Atmospheric Sciences
Mathematical & Computer Sciences				Remove Computer Sci

12	143,098	6.4%	Merge w/ Infor Sci
Computer and Information Sciences			(Revised & New Field)
			Allied w/Information Sci Add Computer Prog and Software Add Computer Sys Mgt and Standards Add Cybernetics Add Computer Hardware
Navigation, Detection, and Countermeasures			Requires breakout
17	154,652	6.9%	classified exceed 4% security guidelines
Navigation, Guidance and Vehicle Control			Breakout field
Physics	20	226,350	10.1% (Combined w/ Astrophysics)
			Combined With Astrophysics Sep Theoretical Physics from Applied Physics
Biological and Medical Sciences (Separation)			
6	133,503	6.0%	Sep BioSci from Medical Sci
Biological Sciences			Breakout Field(Revisions)
Medical And Pharmaceutical Sciences (Allied)			
			(New Field-Pharmaceutical Sci) Allied w/ fld Pharmaceuticals
Mechanical, Industrial, Civil & Marine Engineering (Changed)			
13	118,979	5.3%	Add Systems Engineering Sep Indus, Engr, & Production Equip Constr Equip Material, Supplies, Containers & Packaging Couplers, Fasteners, Joints Hydraulic & Pneumatic Equip Machinery & Tools Pumps, Filters, Pipes, Tubing, &
Machinery, Tooling and Packaging Technology (New Field)			
			Incl Equip & Supplies, Mach New Field to accept Equipment taken from field 13.

Astronomy & Space Technology (Combined Fields)

D. Other Reasons For Adopting Changes

Government agencies whose committees were involved with the development of the original COSATI Subject Category List, First Edition, December 1964 provided the basis for uniform subject arrangement of scientific and technical reports for announcement and distribution purposes as well as management reporting. For DoD documents this included consideration for and establishment of security guidelines. It was determined, as a rule of thumb, that the subject breakdown on which to base release of classified information should be no more than 4% of any agency's holdings under any single category. If this rule is followed then fields 15 and 17 should be revised since they each make up about 7% of the DTIC database. It would be advisable to separate portions of field 15, **Military Sciences**, and field 17, **Navigation, Detection, and Countermeasures**. Changes in some other fields are also needed.

D.1 Computer and Information Sciences

This field will continue to be a high growth area for the next 20-30 years. Terminology in this area is rapidly changing because of technology growth. Over 70% of the documentation that resides in the **Mathematical and Computer Sciences** field during the last 20 years is concerned with computer technology. Computer Technology is the leading edge in providing the apparatus for harnessing information technology. This role will greatly expand well into the next millennium and presently accounts for more than one of every 10 documents that have been sold by DTIC. Documents reproduced in this field equal 40 times their number. From the growth ratio alone, computer technology deserves to be an inclusive portion of the classification scheme and DTIC needs to provide more direct access to this information.

Scope Notes:

Information Systems Technology:

- computing machinery technology
- command, control, communication, and network integration
- computing intelligence and information systems
- computer aided design and computer aided manufacturing
- high performance computing technology
- human factors and systems interfaces
- information security and secure data systems
- intelligence data handling systems
- computer modeling and simulation
- computer networking and data switching technology

D.2 Astronomy and Astrophysics

The archaic meanings associated with celestial observations and

positioning calculations changed with the advent of 'Sputnik' in 1958. Measuring instruments, mathematical calculations and celestial observations today are more or less associated with space technology, roving space vehicles, electronic technology and computing machinery than with observers, theory and physics. Documents applied to this field represent less than one half of 1% of the total document fields. These documents could be more beneficial to individuals whose interest is mainly in space technology. The associated field 'Astrophysics' would be more beneficial to individuals involved with the physics of space and should be grouped more appropriately under physics.

D.3 AGRICULTURE (Alignment)

The agriculture field makes up less than four tenths (.4%) of 1 percent of the total fields and during the last 7 years average about 80 postings a year. The decline of activity in this area should continue in the future, mainly because of the continuing demise of the small farmer and the growth of agri-business conglomerates. Activity in this area could be grouped under either the Earth Sciences or the Biological Sciences field. Major DoD activity in this area was concerned with anti-crop agents and defoliants that were used during the Vietnam War and the after effects of these defoliants on U.S. troops.

D.4 ATMOSPHERIC SCIENCES (Alignment)

The atmospheric sciences field has undergone significant changes since the 1960's with the advent of meteorological satellites, high resolution weather radar, and computing machinery replacing the data generated by thousands of dispersed weather stations, weather balloons, sounding rockets and weather maps. Some of the previous research is being superseded by advances in other fields, i.e., electronics (especially radar), space technology (satellites), and computer technology (real time data processing). However, there is still significant activity and interest to continue the present field, but interest in this area is closely allied with oceanography. Since research in these two fields is closely related, merging them should facilitate better access by research personnel and scientists who favor the 'one stop shopping concept' that promotes easier accessibility. Oceanography should be changed to the broader field "Ocean Sciences."

D.5 BEHAVIOR AND SOCIAL SCIENCES (Realignment)

Portions of the behavior and social sciences field has experienced tremendous growth over the last decades, especially in the areas of administration, management and the information sciences. This field contain the fifth largest data category for DTIC. It has already been suggested that within this field the elements dealing with the information and management sciences be separated from the sociological and psychological elements to promote better access to the management-type information. Major criticism concerning communicability is voiced by individuals attempting to extract information buried within this field.

Dr. Milstead, in her "Indexing Studies" of DTIC, voiced major concerns about the groupings of this field. A minimum corrective effort should remove the administrative and management data from the behavioral information.

D.6 Machinery, Tooling, and Packaging Technology (NEW)

This information has been a part of the engineering field since first conceived by Central Air Document Organization (CADO) at WPAFB, Ohio during the early 1950s. Much of documentation deals with test results, the effectiveness of the packing materials or component machine shop practices, etc. Tens of thousands of IDEP type data exchange documents have diluted the engineering documentation, making retrieval more difficult by precipitating false drops. This type of documentation is more concerned with test results than with engineering applications. Many requesters who seek information in this field are looking for manufacturing practices and test results of nuts & bolts technology. It needs to be separated from engineering design and applications.

E. Handling Defense Planning, Requirements and Acquisition Information

E.1 Management Sciences & Technology (New Field)

Requirement: Provide the basis for capturing information concerning future management objectives to ensure that DTIC remains capable of acquiring, categorizing and identifying relevant STI to be included in its databases that helps fulfill mission requirements. Changes in the acquisition work-force vision necessitates vigorous term identification in this area.

Scope:

DTIC needs to create a new groups to include categories on functional analysis, mission analysis, studies and analysis, and fully integrate other documentation involved with management, administrative, technological and acquisition type studies. Please review the definitions for these terms in the following sections. Documentation targeted would include policies, regulations, decision support, and programming, planning and budgeting type reports.

E.1.1 Procurement and Acquisition Terminology

DoD STIP Instructions specifically relate to acquisition and planning document handling and dissemination under the following paragraph:

DoDI 3200.xx, Sec 1, C-9 Policy Concepts and Principle Functions of the DoD STIP: The operation of programs to effect exchange of Defense technical planning, requirement, and acquisition information with industrial or other organizations.

E.1.2 Military Critical Technology List(MCTL)

Purpose:

MCTL is a reference tool for use by individuals who are evaluating technology transfers through technical reports and scientific papers (by various means) to potential adversaries who may use the information to obtain a competitive advantage or present a military threat to the United States.

Definition:

MCTL is a collection of militarily significant critical developing technologies which covers the development, production and utilization of approximately 10 percent of the advanced technologies in the United States.

Scope:

MCTL is compiled by 15 Technology Working Groups(TWG) who present summaries containing an Overview, Rationale, and a Foreign Technology Assessment for each of 18 sections and their subsections. Several military organizations have adopted these sectional formats and constructed technology codes in an effort to categorize their research technologies around the same parameters or what the TWG considers as critical technologies.

E.1.3 Mission Area Studies

Mission area studies can be grouped in field 15, Military Science or in the new field Management Sciences and Technology as appropriate or aligned according to security guidelines in effect.

Mission (Definition)

Any particular business, service or duty assigned to be accomplished by a person, organization, office, detachment, or the like, with the objective of contributing functionally to an overall objective.

Mission Area (Analysis) Codes

Continuous analysis of assigned mission responsibilities in the several mission areas to identify deficiencies in the current and projected capabilities to meet essential mission needs, and to identify opportunities for the enhancement of capability through more effective systems and less costly methods. Documentation would include **Mission Needs(statement)** and **Mission Elements**.

E.1.4 Functional Analysis Studies

Documentation concerning functional analysis studies can be placed in field 15, Military Sciences, if classified, or the new field, Management Sciences and Technology.

Functional (Analysis) Codes

An approach to the solution to a problem in which the problem is broken down into its component functions, such as intelligence, firepower, or mobility. Each relevant function is then further analyzed and broken down into smaller functional components until a level of molecularity suitable for solution of the problem is attained. Documentation would include Functional Support.

E.2 Technology Research and Planning Strategies

Documentation falling in this area could be entered under **field 15, Military Sciences**, or the new field **Management Sciences and Technology**. But some of documentation entering this field is concerned with military technologies and technology planning that cannot be adequately described under the present **Military Science** categories. There appears to be a need to broaden this field to include **Military Sciences and Technology**.

E.2.1 Technology Areas:

That covers documentation related to the management, planning, programming, budgeting, assessing, and controlling technology transfer that would include:

Technology Research & Planning Strategies

- DoD Science and Technology Planning
- Defense Technology Objectives
- Joint Warfighting S&T Plan
- Defense Technology Area Plans

Basic Research Plan

Includes areas presenting DoD S&T vision, formulated broadly, and subjected to evolutionary and sometimes abrupt changes over time.

Basic Research Strategies

- Strategic Research Objectives
 - Objectives that define expanding research fronts with high potential military benefit that offer scientific opportunities to cross-cut multiple fields of science.

E.2.2 Ongoing Effort to Establish Technology Codes:

The Military Critical Technology (MCTL) Codes, Mission Area Codes, Functional Analysis Codes and Defense Technology Area Planning Codes are attempts to numerically categorize specific subject areas of interest to the controlling work groups. In some cases the attempts point to deficiencies in the DTIC Subject Categorization effort that failed to address these concerns.

One example is the so called technology codes that are not really related to documentation or any research base designations but rather on the critical technology areas

considered by the Technology Working Group (TWG). Each of these sectional areas convey broad or general terminology for spectrum coverage, and the sections and subsections designations may change between each publication.

However, some of the sections and subsections of the MCTL could be considered as candidate groups in the DTIC Subject Categorization Guide if DTIC would set up a separate field such as Management Sciences and Technology. There would be no need to establish and maintain separate technology codes.

E.2.3 Code Mapping to COSATI Fields and Groups

DTIC-OCC and OCS personnel have attempted to map IR&D technology codes to COSATI Fields and Groups codes and Defense Technology Area Plan (DTAP) codes. It appears that the IR&D Technology Codes and the DTAP codes are task and project oriented rather than subject area oriented. These sub-areas closely resemble tasks associated with early Program Element descriptions. Consequently, some of the COSATI Subject Fields and Groups Codes are too broad to accommodate useful mapping. The mapping process would be helped if and when DTIC either incorporates sub-languages into the COSATI Fields and Groups infrastructure or provide a micro-thesaurus of domain-specific terms for each general subject heading.

E.3. DTIC Contributors Guide:

If one was to carefully review the Contributors Guide on setting up and using the proposed technology codes it would be found that the numerous "technology" phrases or headings contain no basis for subject indexing and retrieval. Basic rules for abstracting and indexing are ignored. For example, Space Platforms with sub-areas like Space + Propulsion. Contrary to established rules, the guide pre-supposes that the documentation already has been subjected to an indexing scheme similar to MAI and some type of categorization has previously taken place that addresses definitions, scope notes, meta rules, index term assignments and phrase structures. This seemingly, has not occurred.

But what if organizations insist on establishing separate coding for the information under their control? And just suppose these organizations' (technology) codes have provided a method of information collection, processing, retrieval, analysis, and dissemination, then there would have been adequate efforts expended toward achieving standardization, convertibility and transferability. This also has not occurred. Even within the controlling organizations themselves, retrieval is difficult or impossible.

Searchers who are trying to retrieve information under

the "supposed technology codes" usually end up saying, "It's not what they say it is--the data just isn't there!" Terminology must be entered into a database system in a manner that the computer is able to later recognize before it is considered to be retrievable.

The failure of the "technology code" effort emphasizes the widespread lack of familiarity with DTIC's indexing policies and rules. It also points up the lack of familiarity with DTIC services, sources, procedures and techniques for acquiring and handling DoD information. DTIC is somewhat the blame for this ignorance because most of the knowledge concerning its specialized database indexing and retrieval operations reside inhouse. Therefore, DTIC should provide specialized training to external organizations who are required or want to use its information services.

E.4 Providing Information Service Training:

As a minimum, DTIC should establish a school or provide an extensive systematic training program in information services that would include indexing, retrieval, and thesaurus development courses. It should be offered or designed with distributed learning technologies that use an innovative Web-based learning technique. The Web environment guides and supports the students through the learning processes. DTIC instructors can track progress and provide individual assistance when the need arises. Students should be able to interact online with the instructor and other students. This type of training is faster, cheaper, and better than onsite training.

The school should develop specialized, in-depth courses in specific problem areas and emphasize special retrieval and reference services that would help alleviate problems like those occurring with the technology codes. It would certainly help in providing more complete, timely, and less costly information transfer and result in more satisfied DTIC customers.

Part II: A. SUBJECT CATEGORIZATION METHODOLOGY

A.1 SCG: An Information movement and management Tool

The Subject Categorization Guide(SCG) has evolved into more than a means of providing subject categorization schemes by becoming a technological tool used to access, move, store, and manage DTIC information products in all their various forms. It is inextricably bound to the fields and groups (F/G) terminology that provides the basis for the Machine Aided Indexing(MAI) processes, DTIC's vocabulary control, and thesaurus management requirements.

A.2 Information Access, Indexing and Vocabulary Control

The SCG performs a very useful categorization function that permits cataloging all documents according to prescribed fields and groups. Presently there are 25 fields and 261 groups.

The entire purpose of indexing reports is to classify, group and store the information for later retrieval or whenever needed. The DTIC Indexing Systems consists of all the processes used to input the document into the appropriate database.

The DTIC Indexing System:

- 1.Places all controlled subject terms into two online fields, and in the WUIS database, put identifier terms and author submitted terms in a separate field.
- 2.Permit weighting by using value judgment of Indexers or statistical processing software, if available.

The Thesaurus Management System:

1. Establishes and preserves a semantic relationship between terms through thesaurus management.
2. Develop and structure index terms hierarchically for online displays.

The DTIC indexing system has already accomplished the (4) needs cited above, but other improvements beyond these basic requirements are needed.

A.3 Field/Group Selections and Machine Aided Indexing(MAI)

A.3.1 Problems With MAI Term Selections

Because MAI cannot conceptualize the contents of documents, nor discern the multiple meanings in sentences or grammatical phrases, it is not suitable for automatic indexing without human review or a companion expert system knowledge base. This could be because MAI is not linked to any semantic relations that determine word definitions based on a sense element from the parts of speech. But DTIC could establish some sort of selection mechanism for application within its multi-disciplined databases. One method proposed using the F/G as automated syntactical data switches that controls MAI term selection. This method appears feasible, but all the Thesaurus terms will need to be assigned to a F/G and the F/G selection must be done prior to processing, either by an analyst or through statistical means. It will also need to be extensively tested.

A.3.2 Enhanced Indexing of Document "Aboutness."

If at all possible, DTIC should MAI terms from the table of contents as well as the title and abstract. But there should be a limit on the number of pages referenced through the table of contents. The table of contents often provides more concise topical headings than the abstract. It is better at portraying document "aboutness." The necessary program changes to effect this improvement is minimal compared with the enormous benefits that could be derived.

A.3.3 Overhauling Phrase Selection Software

MAI should omit words from phrases during the phrase selection routine if they are not content-bearing or essential to the meaning of the phrase. A recent study has suggested that MAI selections may contain up to 50 percent of these non-essential terms. Omissions may be accomplished by limiting the prescribed subject fields and groups.

A.3.4 Establishing System to Handle Lexical Variants

Lexical variants are different word forms for the same expressions. Some of these forms are derived from spelling and grammatical variations, but many are captured from acronyms or abbreviations. These unwanted terms cause significant amounts of database clutter. Many of these variants can be eliminated by restricting the Fields MAI can access for posting terms.

A.3.5 Subject Access By Structured Categorization:

DTIC fields and groups should be linked into a hierarchically-structured categorization system. This would

enable users to explode headings online to broaden or narrow searches at will. It should be possible to access the system at different levels of specificity. The user should be able to sort retrieved sets online by field and groups and determine the distribution of the items or select a subset.

B. DTIC Thesaurus Management

B.1 Thesaurus Utilization by Online Indexers

Nearly all DTIC indexers utilize the online Thesaurus rather than the printed version. The electronic version is more accessible and facilitate usage. Changes and revisions can occur more rapidly and maintenance is easier. However some improvements are needed:

1. Establish essential navigational(GUI) devices to permit better access to:
 - a. Field/Group codes
 - b. Scientific & Technical Area Codes
 - c. Related Terms and other online Thesauri
 - d. Identifier Type Terms
 - f. Use For Reference Terms
 - g. Associated Terms
 - h. Technical Dictionary Access

DTIC should discontinue the paper-based thesaurus that is costly to complete, print and maintain. The entire thesaurus revision should be accomplished electronically. A complete digital environment(paperless) is mandated for DoD by the year 2002. DTIC thesaurus managers will need to accomplished this task as soon as possible. The same data should not have to be entered and re-entered. The savings from adopting electronic data handling will significantly increase the productivity of the subject specialist and lexicographical personnel maintaining the thesaurus. This task should also help reduce the amount of reference material at various locations within the branches.

B.2 Constructing a Microthesaurus of Sub-language Terms

Provide for a Microthesaurus of sub-language and technical terms: include technical languages as a part of sub-fields or groups. Address the feasibility of incorporating Sub-language Terms and Domain Specific(technical) Language as a means of improving communicability between the databases and its users. Sub-language terminology is readily available in literature at the laboratory or unit level.

B.3 User Access Thesaurus

DTIC should provide two distinct online Thesauri: one for end users that would provide a dense semantic network with a large entry vocabulary, and the other for indexers that is mapped to the more controlled vocabulary and categorization scheme. Also acceptable would be a knowledge-based user interface that converts natural languages or use references into controlled vocabulary terms. Online users need not be concerned with term selections based on a controlled vocabulary.

B.4 REVIEW OF OTHER THESAURUS DEVELOPMENT

DTIC's Thesaurus management should follow the prescribed equivalence, homographic, hierarchical, and associative relationships displayed among terms identified by the National Information Standards Organization(NISO).

Thesauri developed by other organizations appear to be limited or confined to their specific missions. The National Institutes of Health (NIH) has a well-developed National Library of Medicine (NLM) Thesaurus concerning medicine, pharmacy, biology, and drugs. NLM maintains Medical Subject Headings (MeSH) on the Internet. There are over 18,000 terms used to index MEDLINE and MEDLARS and other databases.

American Petroleum Institute(API) Thesaurus is well endowed with terminology expressing geology, mining, oceanology, and other earth sciences.

Although the National Aeronautics and Space Administration (NASA) Thesaurus is more complete than most other Thesauri it still emphasizes aeronautics, space technology, atmospheric, guided missiles and rocket technology, ergonomics, materials, mathematics and astronautics as well as sub-languages, identifiers and generic terms. NASA also maintains an electronic version on the Internet.

The Department of Energy(DOE) thesaurus is mostly devoted to physics, atomic energy regulatory terms, nuclear weapons and weapon testing, radiation effect, and energy utilization.

The Library of Congress maintains several online Thesauri, among them are Thesauri of Graphic Materials (TGM I & TGM II), Global Legal Information Network (GLIN), Legislative Indexing Vocabulary (LIV), and a Universal Decimal Classification system.

Although cooperative agreements may occur between various agencies regarding Thesaurus utilization, it is doubtful whether these or other organizations will maintain interest in developments beyond their mission requirements.

B.4.1 Thesaurus Management System and NISO Standards

DTIC's thesaurus should follow the standards recommended by the National Information Standards Organization(NISO) in regard to maintenance and management procedures.

C. Effects of Indexing Constraints on User Requests

DTIC deals with complex multifaceted user requests. These multifaceted requests are subjected to the constraints identified by the MAI software and subroutines, and by the definitions and scope notes accompanying the SCG. The SCG provides F/G definitions where certain basic principles or axioms can be encoded as metarules(generalizations based on experiences). These

rules can serve as constraints on the indexing system where the subject analyst is concerned with key features in related fields and groups.

These features can be extracted and then matched against a given search pattern in order to make a positive identification. Setting up constraints on possible combinations can provide significant help in obtaining good information and/or in eliminating areas of unlikely possibilities. But exceptions to these rules may occur and this effort could be influenced by the analyst's judgment.

One example is where basic research involving biochemicals used in biological warfare agents is under field 15, Military Sciences, instead of field 6, Biological and Medical Sciences. The reason for this is based on security precautions rather than subject access.

Another example would be where long phrases occur and MAI software may discern only key portions of the phrase, but enough data could be extracted to enable positive identification. However, restraints in the selection process subroutine with respect to the number of accepted words in the phrase can cause the whole phrase to be rejected. The whole phrase need not be discarded just because the phrase exceeds the term limit.

D. The Categorization Scheme

Use of the term categorization is interchangeable with the term Classification. In this report categorization is the preferred term. There appears to be no problem with the categorization scheme except those induced by benign neglect. Regular maintenance and review is required on a much broader scale than has been scheduled in the past. This small effort alone will alleviate much of the criticism connected with the terminology.

D.1 Categorization Schemes for Generic Terms:

There is a need to recognize a large number of terms and determine where they fit in the categories or groups provided by the subject categorization scheme in use. The jargon must be familiar to the disciplines of the user population. In this category there are many generic terms that are equally applicable to many fields and groups. These generic terms may be placed into separate fields and groups and their application or selection can be subjected to a judgment call by the indexer or the MAI system. This new field could become the most important portion of the categorization scheme. Many generic terms are part of the low-information-content word group.

D.1.1 Objective of Categorization Scheme

Of course, it is important for both the users and experts in the field to understand and agree with the scheme. The optimum objective is to provide subject access at the chapter level, thereby greatly increasing the specificity of the vocabulary. One means, discussed earlier, of increasing specificity is to index the table of contents as well as the title and abstract. Changing

the categorization scheme, revising or increasing the fields and groups, adding sub-language terms, and accepting selective keywords all tend to increase accessibility to the document collection and promote better communications between users and the system.

D.2 Changes to Categorization Scheme

Although no DTIC automated method exists to introduce change in the categorization scheme one should be implemented. The DTIC scheme is based on more than a half century of input, from shelf lists of ASTIA subject headings and automated decimal coding of the older punched cards collating systems to the present day computer resident diversified databases. Even with the present diversified databases the need still exists to preserve access to those older records. DTIC should update its present thesaurus by incorporating terminology from other thesauri and maintain its own categorization scheme that is configured to its original diversified databases. Any new field entries should follow the old categorization scheme's structure.

E. DTIC's Diversified Databases

DTIC, a more pronounced organization with large diversified databases, requires significant multi-disciplined thesaurus structuring-including scope notes, category assignments, hierarchical relationships, and cross references if appropriate. Any new subject category assignments will necessitate significant changes in the thesaurus structure. Constraints on how the subject terms are applied to indexing is required by the definitions.

No other organization with such large highly diversified databases depends on terminology confined to one thesaurus. One approach by The National Technical Information Service (NTIS) conveniently uses several thesauri from other organizations such as DTIC to extract terminology if there are insufficient indexing terms. Such an approach for DTIC is worth considering.

Another method could be to break-up large document collections into several smaller collections and use one thesaurus for subject terms, and keep the collections segregated. The difficulty here is knowing which collection(s) to search.

This method would not only extend the learning curve for data searching and acquisition, but also increase the time required for searching if the information one seeks is in more than one collection and the searcher is unsure of which ones are applicable. A user interface would be helpful but may not fully compensate for the additional time required. It is also conceivable to index the databases with several macro-thesauri, especially if employed with automatic retrieval capability. In either method, if automatic indexing is applied, problems will occur with the selection of variants and generic terms not conducive to retrieval. DTIC is currently experiencing this problem with

Machine-Aided Indexing(MAI). Of course, one solution here would be Machine-Aided Retrieval(MAR) utilizing an online user's thesaurus with a natural language processor. If the thesaurus existed only online in electronic form it could contain several thesauri from various other organizations as well as significant natural languages: English as well as foreign. Unlike a printed volume, such a tool would not become too unwieldy.

F. Index Enhancement and Technological Change

The solution to inaccessible documentation can be as simple and low-tech as enhanced indexing. DTIC needs to re-examine all the processes connected to the indexing and categorization scheme in light of what the new technology can make possible toward enabling greater access and easier communication between the DTIC databases and its users. Just improving incrementally the older technology to make obsolete tasks a little easier is no longer supported by the technology conscience users and others who have experienced Web browsing, hypertext linking, and other sophisticated GUIs.

F.1 DTIC Should Initiate Changes

DTIC, as the major stakeholder and document custodian of computerized DoD information, should take the initiative in making the necessary changes and encourage sufficient dialogue to perceive user satisfaction. No other entity has as much at stake as DTIC. Consequently, any changes may be seen more as a DTIC fiduciary requirement for the benefit of its customers. DTIC will need to bear the initial costs with portions passed on to the customers in higher fees for products and services. Information providers must find ways to establish alliances and communication networks with each other in order to help defray expenses in processing and maintaining databases. Cooperative agreements supporting multi-discipline, multi-lingual thesauri have already been accomplished. But much more effort is needed, especially in the international arena.

G. Estimated Initial Cost And Benefits

Number of new entries	6,000
Number of new cross-references.....	15,000
Rate per new entry (\$ 4.75)	\$99,750
Rate per new page... (30 entries @\$142.50)	
Terms for automated conversion.....	22,000
Editing time per new term..... (3.6%)	\$ 3,591
Identifying and marking-up text(1.5%)	\$ 1,496
Inputting entries (3.0%)	\$ 2,992
Administrative time (5.0%)	\$ 4,988
TOTAL	\$ 112,817

G.1 Cost Benefits and Improvements

The categorization system should be designed to satisfy the needs of different categories of users like facilitating the transfer of research results from the scientist to the

engineer, especially on intricate and interdisciplinary problems. The cost effectiveness ratio for introducing new categorization schemes and improving upon existing ones needs to be determined in terms of the services rendered. Different schemes may also be evaluated in terms of system cost for an equivalent amount in quantity and quality of information transfer.

The improved SCG must satisfy other user requirements. One requirement of an improved SCG is that it will have the potential to increase accessibility by reducing the time required to obtain needed information. Another requirement, based on the proceeding one, is that each improvement also has the potential to increase the productivity of DTIC users.

G.2 User Perception of Value

DTIC, as a user oriented organization, is especially concerned about what the user perceive as value. The perceived value approach, useful to DTIC Marketing personnel, was based on subjective evaluation performed by users of the DROLS information system or service. The underlying premise is that users can recognize the benefits they gain from a system and are capable of transforming these into ranking scales and/or monetary terms.

One feasible and practical value approach is to seek what perception DTIC users have concerning the changes that have taken place with the SCG in affecting the way they work and whether these changes have been beneficial or detrimental. Coupled with this user perception should be the perception of DTIC management and other stakeholders concerning what effect these changes have on their efforts. When the focus of their evaluations move from the level of technical performance to organizational impact, the importance of these perceptions and judgments increase. DTIC already has experienced significant changes because of implementing EDMS. Changes made in the SCG will affect the users, DTIC employees and management.

Another approach is to determine customer satisfaction based on retention and loyalty. DTIC, over the last 10 years, has experienced an approximate 50% reduction in DROLS sites and usage. No one, at this time, can precisely say why this is occurring, but this decline needs to be fully investigated and counter-acted upon. Information access and availability is most certainly a factor. The values delivered to our customers should be measured against customer-delivered value from other information providers. From whom are these former customers now receiving their information? From our own surveys, it appears that our customers, beside wanting more accessible information, also want DTIC's help in pulling together information from a variety of sources, including the Internet, and putting it in a usable format. Reversing these customer losses and/or the lack of database usage needs to receive top management's undivided attention. Extensive corrective action, along with ample

resources, needs to be invested into a viable formula for improving retention and loyalty of DTIC customers.

H. Data Support, Information Access and Communications

H.1 SCG Should Support Intermingled Research Data

The indexing, cataloging, processing, and storage systems for scientific and technical literature may be significantly different from that of other literature such as Law or the Arts. But the intermingling of research data from the scientific and technical disciplines on one hand with the social, arts, and humanities of the other is occurring more extensively and rapidly today. This is revealed in significant increases in administrative and management reporting of the last decade. Over 50,000 documents have been identified and entered the DTIC databases since 1980 with issues concerning sexual harassment, age discrimination, flexible workplaces, employment of handicapped individuals, etc., as well as regulations and findings that support enforcement and management changes. Many of these documents are being meticulously examined by DoD agencies and their contractors. This trend is not reflected in the present SCG but suggestions have been made elsewhere toward implementing needed changes. This trend will continue well into the next millennium when the flow of this type of information will quadruple.

H.2 SCG Compatibility with National and International Standards

DTIC Categorization and Indexing schemes should be compatible with national and international procedures and standards. The SCG defines the subject areas for which DTIC and other Federal Agencies may accept responsibility for ensuring effective transfer and dissemination of national and international information. SCG will facilitate the acquisition and handling of documentation involved with translation of foreign documents, copyrights and patents generated from foreign defense and non-defense related technologies, as well as the information transfer of foreign non-print products.

H.3 Information Access and Communications

Information Access and communications, as an integral part of the overall DTIC information management program, is the main objective for indexing, processing, and retrieving DoD information. It involves not only quantifiable numbers but also a measure of the unquantifiable results as portrayed through corporate philosophy, intuition, instinct and corporate culture. Much of the unquantifiable is based upon an individual's or an organization's personal knowledge base conceived by customers as a portion of DTIC's value delivery system.

Quantifiable measurements could include an increase in the customer base, an increase in document flow, and a decrease in the time required to produce and distribute the products.

Customer loyalty through retention levels is also a quantifiable measurement. These measurements could also indicate the degree of satisfaction by our users, contributors and employees.

I. SCG Strengths Weakness Opportunities & Threats Matrix (SWOT) Analysis: A Strategy-Formulation Process

I.1 Strategy Formulations

The following analytical tools are presented more as a means to facilitate, rather than diminish communication. Without objective information and analysis, personal biases, politics, emotions, personalities, and halo error (tendency to put too much weight on a single factor) may play a dominant role in the strategy-formulation process. DTIC must develop and execute good strategies to grow and prosper.

The strategic-formulation process requires good intuitive judgment in order to be successful. The SWOT Matrix helps managers develop four types of strategies where DTIC can be fitted: SO Strategies, WO strategies, ST Strategies, and WT Strategies. The reference point is the entire DTIC effort associated with the information movement, management, control, and accessibility influenced by the SCG.

<u>I.2 SWOT MATRIX</u>		
	Strengths-S	Weaknesses--W
Always Leave Blank	List Strengths	List Weaknesses
Opportunities	SO Strategies	WO Strategies
List Opportunities	Use Strengths to take advantage of opportunities	Overcome Weaknesses by taking advantage of opportunities
Threats-T	ST Strategies	WT Strategies
List Threats	Use Strengths to avoid threats	Minimize Weaknesses and Avoid Threats

I.3 Strategy Formulation and Participation

In the following strategy formulation for DTIC all the feasible alternatives that could benefit are not considered because there could be an infinite number of ways to implement those actions. The strategies presented here are only a start. This beginning provides the best opportunity for concerned

managers and employees to gain an understanding of the objectives and participate in the strategy analysis and choice activities. Alternative strategies proposed by the participants should be considered and discussed at a series of meetings established for this purpose. Once the proposed strategies are identified and understood, the strategies should be ranked in order of attractiveness by participants.

Order of Attractiveness:

- 1= Should not be implemented
- 2= Should possibly be implemented
- 3= Should probably be implemented
- 4= Should definitely be implemented

I.4 Developing Strategies

Developing strategies that use strengths to capitalize on opportunities can be considered an offense, while strategies designed to improve upon weaknesses by avoiding threats can be termed defensive. DTIC has some external opportunities and threats and internal strengths and weaknesses that can be aligned to formulate feasible alternative strategies. The Matrix is helpful in making strategic decisions about the alternatives available to the revision and enhancement of the SCG.

Other than ranking strategies to achieve a prioritized list there is an analytical technique that evaluates alternative strategies objectively. The Quantitative Strategic Planning Matrix (QSPM) is based on the External Factor Evaluations Matrix and the Internal Factors Evaluations Matrix. These key external and internal factors are Critical Success Factors and are assigned weights identical to those in the Matrix. Then numerical values that indicate the relative attractiveness to a given set of alternatives are determined. Any factor that affect the choice of the strategies being made are compared relative to the key factor.

The range of attractiveness scores:

- 1= Not Attractive
- 2= Somewhat Attractive
- 3= Reasonably Attractive
- 4= Highly Attractive

I.4.1 Strengths:

1. DTIC is DoD's Primary Document Distribution Center,
2. Onboard Staff Are Highly Trained Professionals,
3. DTIC Thesaurus is Widely Utilized by DTIC, DoD, Contractors, and Other Professional Staffs,
4. SCG is Utilized as an Effective Document Classification/Vocabulary Control Mechanism for A DTIC collection of over 2,000 K Documents,
5. SCG Promotes Information Movement and Management,
6. SCG Fields and Groups Permits Document Management and Selective Dissemination,
7. Maintains On-site STI Policy Office Responsibilities,

8. Affixes Value Added Services through the Indexing Process,
9. And Provides a High Capacity Computerized Information and Reproduction Facility.

I.4.2 Weaknesses:

1. Term Anachronism:
 - SCG Revisions Are More Than 10 Years Old
 - Resistance to Needed Changes in Terminology Exist, and
 - Several Fields Need Restructuring for proper input,
2. Too Stringent Vocabulary Control Mechanisms Are In Place,
3. Categorization Scheme Lacks Hierarchical Structure,
4. Automated Online User Access Terminology is Lacking,
5. Sub-language and Domain Specific Terms are Lacking,
6. Indexers and Users Don't Speak Same Language
 - Because of Indexer's State-of-the-Arts Learning Curve,
7. MAI Needs Enhancements:
 - To update Recognition Dictionary
 - To Provide Better Phrase Selection Routines
 - To Reduce Generic Term Selections
 - To Remove Erroneous Terms and Variants, and
8. Proactive Collecting Initiatives are Lacking causing DTIC not to Timely Acquire Needed Documents.

I.4.3 Opportunities:

1. Establish Leadership in Thesaurus Development:
 - Provide Automated Links to Other Agency Thesauri,
2. Establish Hierarchical Categorization Scheme and
 - Include Reference and Usage Terms in DRIT,
3. Expand User Base by Obtaining High Interest Documents,
4. Use Fields/Groups for High Level Primary Information Dissemination,
5. Establish A Proactive Document Acquisition Policy,
6. Establish Acquisition Database within Collection,
7. Enhance SCG Fields and Groups Definitions and Terms,
8. Establish 'Metarules' constraints as Scope Notes,
9. Customized Covers and Title Pages of Documents and
 - include organizational Information,
10. Establish Audit Trails into MIS Databases (DD 350, WUIS, and IR&D) to Enforce Compliance, and
11. Expand DTIC's Mission into Acquisition Activities.

I.4.4 Threats

1. Failure to Collect Important and Needed Documents,
2. Lack of Communicating Tools are Causing Users to Go Elsewhere for Needed Information,
3. More Agencies are Placing Their Reports Up On WWW,
4. Decrease in New Limited Information Document Input,
5. Decrease in New Total Document Input,
6. DTIC is Receiving Less Than 33% of Appropriate New Documents, and
7. Agency's Functions May Be Privatized.

I.4.5 SO Strategies

1. Establish Workgroups and Provide Leadership in Thesaurus Development,
2. Enhance and promote Information Movement and Transfer Methods by Reviewing, Revising and Changing Outdated Regulations,
3. Promote and Improve Primary Document Distribution to OSD Components,
4. Convene scheduled DTIC Users Meetings to Discuss SCG and Thesaurus Development,
5. Provide a Centralize Document Validation System for Control of Limited and Classified Distributions,
6. Provide Term Definitions and Scope Notes for Online Users,
7. Establish an Online Network to Other Agency's Thesauri,
8. Seek and Acquire High Interest Documents,
9. Assign Roving Information Specialist duties of Contacting HQ Monitoring Agencies for Document submissions, and
10. Setup Online Hierarchical SCG Categorization Scheme.

I.4.6 WO Strategies

1. Schedule Regular Review Periods for SCG and Thesaurus Maintenance,
2. Expand Thesaurus Terminology with Sub-languages,
3. Provide More Scope Notes and Use References Online,
4. Provide F/G Controlled MAI Selections,
5. Ensure Popular Terminology is an early Part of Retrieval Vocabulary,
6. Establish an Integrated Document Exchange and Distribution Network for DoD Agencies, and
7. Establish Lines of Communication with Research Laboratories and Headquarters Agencies for Audit Purposes.

I.4.7 ST Strategies

1. Expand Program to Highlight Reports Along With the Corporate Sources Information on Internet and WWW,
2. Limit Number of Archival Documents per Cycle,
3. Provide Online Mechanism to Easier Accessibility,
4. Establish Proactive Collecting as DoD Policy,
5. Increase Document Flow Through Foreign Exchanges,
6. Increase Employee Relationship Marketing Training,
7. Increase Electronic Document Processing, and
8. Use DTIC Distribution Network for Primary Document Distribution.

I.4.8 WT Strategies

1. MAI Archival Document without Post Review,
2. Establish GUI to Internet and WWW to Promote Easier User Accessibility,
3. Require Professional Staff to Become and Remain Aware of State-of-the-Art Research,
4. Increase Collection of Popular Fields Documents, and
5. Emphasize Cost Advantage to Agencies in Reproducing Their Primary Distributed Documents.

Conclusions

Having ready access to DTIC information on the location and acquisition of technical documents is one of the primary concerns of users. DTIC has a responsibility to make this task as economically and painlessly as possible. The subject grouping of documents in a manner readily understood by the user community contributes to the efficiency of the total information network. The ultimate goal is increased productivity of DoD organizations and their contractors. The difficulties associated with this task increases when variations in technical languages becomes barriers to communication rather than linguistic support. Common, easily recognizable categories, i.e., Electronics should not be set-up as unrecognizable Electrotechnology and similarly, small stagnant fields should not occupy prominent positions in the SCG scheme.

Within a decade, enormous changes in technological innovations can take place that could make communicating difficult if these changes in language and terminology are not incorporated as retrieval mechanisms. DTIC seems to be oblivious to the enormous changes that are presently taking place within the DoD Acquisition Process as is evident by the lack of indexing terminology enabling document retrieval for the Acquisition workforce.

Users need not be concerned with controlled vocabularies and should be provided with an online user's access thesaurus or knowledge-based interface to provide easy access into the Inverted Files with commonality to all three databases. Customers have a way of placing a monetary value on the time and effort spent in acquiring useful information. They have a tendency to abandon unproductive retrieval systems regardless of cost.

The research supports continuation of the existing subject categorization scheme with continuous improvements rather than any radical departure. The present scheme, if revised and more fully automated can accommodate future DoD information needs well into the next millennium.

DTIC also has a responsibility to educate its customers about the internal information system operations. DTIC needs to establish a systematic program to provide users with indexing, retrieval, and subject categorization training that cannot be obtained anywhere else. This training should be pursuant to low cost Web-based technologies that use online distributed learning processes.

DTIC should change the scope of the indexed material by including the table of contents in the indexing process. This will establish clearer lines of communication into the document "Aboutness." This

change could be an inexpensive enhancement to delivered customer value.

The thesaurus terminology needs to reflect the present day environment of ongoing research and lexical constructions should be performed automatically. Other thesauri should be incorporated into the recognition dictionary. By contrast, term anachronism, more pronounced in the WUIS and IR&D databases, needs to be removed or compensated by seeking, accepting and adopting continuous changes to terminology within the categorization scheme. Changing the categorization scheme, revising or increasing the fields and groups, adding sub-language terms, and accepting selective keywords all tend to increase accessibility to the document collection and promote better communications between users and the system. The search fields and retrieval mechanisms for all three databases should be the same. The present categorization scheme should be continued with more frequent maintenance and review. Today, Internet GUIs, Web Browsers and other user friendly innovations are expected to be present as information access tools for the unsophisticated searcher and DTIC cannot afford to provide less.

RECOMMENDATIONS

DTIC should proceed with the following recommendations in an incremental fashion. Through a series of steps or phases where each recommendation is tested and evaluated before preceding with any further action or commitment.

1. Initiate daily online vocabulary development and establish continuous maintenance of the recognition dictionary online by incorporating the additional terms suggested through the new field and group categorization structure.
2. Review the 1,000 plus thesaurus terms that were acquired during the course of this research and add the most appropriate ones to the revised fields.
3. Provide easy online access to DTIC SCG with navigational features, i.e., hot buttons, cut and paste, and a variety of display modes, including split screens and highlighting.
4. Report all progress regarding the number of new and added terms to the thesaurus during management reviews. Incorporate new terms into the vocabulary as soon as they are needed for retrieval. Maintain the thesaurus in an electronic online environment accessible in read only mode to anyone having a need to use it.
5. Consider eliminating the Lexical Dictionary altogether or provide database commonality with the DTIC thesaurus for maintenance purposes so that effort to maintain it is not duplicative.
6. Establish online access to other organization's technical database thesauri that permits import connections through Internet features.
7. Establish guidelines for including technical definitions in the scope notes of the SCG fields and groups. They should show meaning and usage as well as hierarchical structuring. Such features should be integrated into the thesaurus and EDMS. The thesaurus should not only provide a full range of terms to cover all the types of material entering the database, but also provide:
 - a) Scope notes to show term meaning and usage
 - b) Dates or periods of term anachronism, introduction and cessation
 - c) Use, related, and associated references
 - d) Sub-language terms suitable for indexing table of contents or chapter-level content.

8. Use the 1975 DRIT as a baseline to establish the enhancements described in Item 7, and to ensure that the effort is extended well beyond what was anticipated during that time frame. One extension could include domain centered or sub-language terms.

9. Establish other uses of the SCG, i.e., in the management and control loop. Some recent uses that were considered show the SCG F&G can provide:

- a) Database Statistics on Document Orders
- b) Periods of Research Activity Growth or Decline
- c) Popularity of Subject Areas
- d) Support for Document Acquisition
- e) Supplemented and Restricted term selections
- f) Automated Primary Document Dissemination
- g) Areas and Extent of Classified Documents

10. Establish a policy or directive that Information Access and Availability is a major issue in DTIC customer satisfaction/dissatisfaction matrix and that all DTIC employees should work to promote better quality access service. Employees should look for means and reasons to provide service rather than hinder or block requests for information.

11. Require EDMS/MAI interface changes to permit the "Table of Contents" to be indexed along with the titles and abstracts to better portray document "aboutness."

12. Establish a Web-based distributed learning center and provide systematic training in information services. Develop specialized in-depth courses to address specific problem areas like indexing, thesaurus development, subject categorization, and database development tools.

13. Encourage Work Group participation in areas of document coding and index enhancement techniques where all parties are beneficiaries. Become the facilitator for better information service connections by targeting conference proceedings and journal articles to disseminate among DTIC user organizations.

14. Identify with efforts to focus on obtaining a useful, valued Subject Categorization Guide as well as a viable active thesaurus for indexing purposes. DTIC needs to change its focus from how much does it cost to what's the best way to obtain improvements and returns on investment. Contracting out this efforts is a more costly option that is not recommended.

15. Provide the software mechanism to effect commonality of data access and data entry for the retrieval(search) fields for all DTIC databases.

APPENDIX 1

Subject Categories Field Ratios for Years 1960-1997 Document Summaries by Fields & Groups for years 1960-1997

[illegible]

DOCUMENT SUMMARY BY FIELDS AND GROUPS FOR YEARS 1960-1997

FLD	Name	CLASS PER FLD	% CLASS PER FLD	FLD TOTAL ALL GRPS	DB % TOTAL	Rank DB	DOCUMENT ORDERS	TIMES DOCS ORDERED	ORDER RANK
1	Aviation Technology	18,290	18%	110,688	4.8%	11	2,892,392	26.13	8
2	Agriculture	420	4.5%	9,318	0.4%	25	125,138	13.43	23
3	Astronomy and Astrophysics	309	3%	11,253	0.5%	24	151,054	13.42	24
4	Atmospheric Sciences	1,483	4%	35,975	2%	18	848,643	23.59	12
5	Behavior & Social Sciences	8,717	6%	149,984	7%	5	5,346,995	35.65	2
6	Biological & Medical Sciences	3,284	2%	133,503	6%	8	1,944,484	14.57	21
7	Chemistry	3,213	4%	124,320	6%	9	1,697,423	13.65	22
8	Earth Sciences & Oceanography	6,884	4%	164,951	7%	2	1,721,669	10.44	25
9	Electrotechnology & Fluidics	10,629	10%	107,311	5%	12	2,787,703	25.98	9
10	Power Production & Energy Conversion (Nonpropulsive)	2,099	12%	17,003	1%	21	324,930	19.11	18
11	Materials	4,348	5%	96,191	4%	13	2,568,587	26.70	7
12	Mathematical & Computer Sciences	6,943	5%	143,098	6%	6	5,719,091	39.97	1
13	Mechanical, Industrial, Civil & Marine Engineering	12,208	10%	118,979	5%	10	2,646,144	22.24	15
14	Test Equipment, Research Facilities & Reprography	3,323	7%	45,741	2%	17	1,124,533	24.58	11
15	Military Sciences	56,742	36%	158,929	7%	3	5,198,985	32.71	4
16	Guided Missile Technology	36,190	42%	85,409	4%	14	1,500,151	17.56	20
17	Navigation, Detection & Countermeasures	74,940	48%	154,652	7%	4	4,529,428	29.29	5
18	Nuclear Science & Technology	4,807	30%	15,832	1%	23	344,421	21.75	16
19	Ordnance	40,279	29%	137,877	6%	7	3,080,396	22.34	14
20	Physics	15,605	7%	226,350	10%	1	5,638,982	24.91	10
21	Propulsion, Engines, & Fuels	10,773	15%	73,587	3%	15	1,293,720	17.58	19
22	Space Technology	7,412	23%	31,542	1%	19	660,236	20.93	17
23	Biotechnology	1,293	6%	19,974	1%	20	688,923	34.49	3
24	Environmental Pollution & Control	86	1%	15,360	1%	22	358,209	23.32	13
25	Communications	11,189	23%	49,500	2%	16	1,432,543	28.94	6
DATABASE TOTALS		341,466	15.29%	2,237,327	100.0%		54,624,780	24.42	

APPENDIX 2

PROPOSED SUBJECT FIELD CHANGES

PROPOSE DTIC SUBJECT FIELDS AND GROUPS CHANGES			
FLD	Present Name	New or Existing Field Name	Proposed Action Or Change
1	Aviation Technology	AVIATION TECHNOLOGY	Aviation Technology (No Action)
2	Agriculture	EARTH SCIENCES	Merge with New Field 8 Earth Sciences AND Biological Sciences
3	Astronomy and Astrophysics	PHYSICS	Combine Astrophysics with Field 20 Physics
4	Atmospheric Sciences	ASTRONOMY AND SPACE TECHNOLOGY	Combine Astronomy with Field 22 Space Technology
5	Behavior & Social Sciences	ATMOSPHERIC AND OCEAN SCIENCES	Combine with Oceanography with Name Chg to Ocean Sciences
		MANAGEMENT SCIENCES AND TECHNOLOGY	Split from Administrative and Management Data (NEW)
		SOCIAL SCIENCES AND PSYCHOLOGY	Expand Social Sciences and add psychology
6	Biological & Medical Sciences	LIFE SCIENCES	Merge Biological Sciences, Add Health Sciences, Food & Ecology
		MEDICAL AND PHARMACEUTICAL SCIENCES	Combine Medical with Pharmaceutical Sciences (NEW)
7	Chemistry	CHEMISTRY	Chemistry (No Action)
8	Earth Sciences and Oceanography	ATMOSPHERIC AND OCEAN SCIENCES	Split Oceanography from Earth Sciences /Allied with Atmospheric Sciences
		EARTH SCIENCES	Merge Agriculture with Earth Sciences
9	Electrotechnology & Fluidics	ELECTRONICS AND FLUIDICS TECHNOLOGY	Split Electronic Technology From Fluidics and Combine Fluidics with Physi
10	Power Production and Energy Conversion	POWER PRODUCTION AND ENERGY CONVERSION	Power Production and Energy Conversion(No Action)
11	Materials	MATERIAL SCIENCES	Material Sciences (Expanded No Action)
12	Mathematical & Computer Sciences	COMPUTER AND INFORMATION SCIENCES	Split Computers from Mathematics (New Allied Field-Information Sc
		MATHEMATICAL SCIENCES AND MODELING TECHNOLOGY	Mathematical Sciences and Modeling New Field(Expansion)
13	Mechanical, Indus Civil Engineering	MACHINERY, TOOLING AND PACKAGING TECHNOLOGY	Split Nuts, Bolts, Fasteners, Packaging, Equipment, etc from Engineering(NE
		MECHANICAL, INDUSTRIAL, CIVIL, MARINE ENGINEERING	Mechanical, Industrial, Civil and Marine Engineering (SPLIT)
14	Test Equipment, Research Facilities	TEST EQUIPMENT AND RESEARCH FACILITIES	Test Equipment and Research Facilities (No Action)
15	Military Sciences	MILITARY SCIENCES AND TECHNOLOGY	Breakout -Defense Systems, Military Forces, Operations, Strategy and Tacti
16	Guided Missile Technology	GUIDED MISSILE TECHNOLOGY	Guided Missile Technology (No Action)
17	Navigation, Detection, and Countermeasures	DETECTION, AND COUNTERMEASURES	BREAKOUT Navigation, Split Electronics AND Electronic Equipment
18	Nuclear Science & Technology	NUCLEAR SCIENCE AND TECHNOLOGY	Nuclear Science and Technology (No Action)
19	Ordnance	ORDNANCE	Ordnance (No Action)
20	Physics	PHYSICS	Merge Astrophysics with Physics
21	Propulsion, Engines, & Fuels	PROPULSION, ENGINES, AND FUELS	Propulsion, Engines, and Fuels (No Action)
22	Space Technology	ASTRONOMY AND SPACE TECHNOLOGY	Allied with Astronomy
23	Biotechnology	BIOLOGICAL SCIENCES	Merge with Life Sciences
23	Environmental Pollution & Control	ENVIRONMENTAL POLLUTION AND CONTROL	Environmental Pollution and Control (Expansion Action)
24	Communications	COMMUNICATIONS	Communications Technology (Expansion Action)
		ELECTRONICS (TECHNOLOGY)	Re-established Field for Solid State, Optical, (NEW)
			Electronic Component Technology and Equipment
		NAVIGATION, GUIDANCE AND VEHICLE CONTROL	Breakout from Detection & Countermeasures

APPENDIX 3

TECHNICAL REPORT FIELD DATA

Technical Reports Subject Fields & Groups for 1960-1997

Technical Reports Classified Fields & Groups for 1960-1997

Technical Report Document Orders By Field & Group 1960-1997

Technical Report Subject Fields & Groups 19960-1997

TECHNICAL REPORT SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
		<u>AVIATION TECHNOLOGY</u>					
	10100	AERODYNAMICS	2,496	2,430	1,538	3,374	9,838
	10200	MILITARY AIRCRAFT OPERATIONS	858	502	1,037	2,664	5,061
	10300	AIRCRAFT	3,290	5,324	5,772	5,082	19,468
	10301	HELICOPTERS	1,855	3,955	2,757	2,259	10,826
	10302	BOMBERS	2,868	2,373	1,253	1,178	7,672
	10303	ATTACK & FIGHTER AIRCRAFT	3,723	5,310	3,555	3,845	16,433
	10304	PATRO & RECONNAISSANCE AIRCRAFT	1,393	1,768	921	531	4,613
	10305	TRANSPORT AIRCRAFT	1,775	1,872	1,052	1,365	6,064
	10306	TRAINING AIRCRAFT	328	365	272	301	1,266
	10307	V/STOL	1,280	1,510	922	242	3,954
	10308	GLIDERS & PARACHUTES	571	630	378	318	1,897
	10309	CIVILIAN AIRCRAFT	794	301	204	147	1,446
	10310	PILOTLESS AIRCRAFT	477	1,047	744	356	2,624
	10311	LIGHTER-THAN-AIR AIRCRAFT	271	285	317	84	957
	10312	RESEARCH & EXPERIMENTAL AIRCRAFT	670	312	504	2,124	3,688
	10400	FLIGHT CONTROL & INSTRUMENTATION	1,864	1,102	1,186	1,185	5,337
	10500	TERMINAL FLIGHT FACILITIES	1,263	2,655	2,029	1,529	7,476
	10600	COMMERCIAL & GENERAL AVIATION	376	469	763	460	2,068
		TOTALS	26,152	32,210	25,282	27,044	110,688

TECHNICAL REPORTS SUBJECT FIELD & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
2	<u>AGRICULTURE</u>					
20100	AGRICULTURAL CHEMISTRY	371.00	185.00	556.00	169.00	1,281.00
20200	AGRICULTURAL ECONOMICS	403.00	191.00	580.00	56.00	1,230.00
20300	AGRICULTURAL ENGINEERING	375.00	237.00	565.00	43.00	67.00
20400	AGRONOMY, HORTICULTURE, AQUICULTURE	497.00	299.00	686.00	133.00	1,615.00
20500	ANIMAL HUSBANDRY AND VETERINARY MEDICINE	674.00	662.00	993.00	96.00	2,425.00
20600	FORESTRY	444.00	310.00	708.00	85.00	70.00
	<u>TOTALS</u>	2,764.00	1,884.00	4,088.00	582.00	9,318.00
3	<u>ASTRONOMY & ASTROPHYSICS</u>					
30100	ASTRONOMY	860	482	1,167	399	2,908
30200	ASTROPHYSICS	2,162	2,204	1,789	875	7,030
30300	CELESTIAL MECHANICS	587	335	782	111	1,815
	<u>TOTALS</u>	3,609	3,021	3,738	1,385	11,753
4	<u>ATMOSPHERIC SCIENCES</u>					
40100	ATMOSPHERIC PHYSICS	3,356	5,788	4,271	2,064	15,479
40200	METEOROLOGY	4,273	5,745	6,204	4,274	20,496
	<u>TOTALS</u>	7,629	11,533	10,475	6,338	35,975

TECHNICAL RERPORT SUBJECT FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
5	<u>BEHAVIOR & SOCIAL SCIENCE</u>					
50100	ADMINISTRATION & MANAGEMENT	3,443	5,853	12,262	10,511	32,069
50200	INFORMATION SCIENCE	3,198	4,985	7,020	6,175	21,378
50300	ECONOMICS AND COST ANALYSIS	2,006	3,867	4,618	5,382	15,873
50400	GOVERNMENT & POLITICAL SCIENCE	1,291	2,481	3,798	5,387	12,957
50500	SOCIOLOGY & LAW	1,116	1,652	2,635	1,924	7,327
50600	HUMANITIES AND HISTORY	3,393	6,616	8,656	3,042	21,707
50700	LINGUISTICS	530	591	724	446	2,291
50800	PSYCHOLOGY	4,025	6,101	5,236	3,578	18,940
50900	PERSONNEL MANAGEMENT & LABOR RELATIONS	1,453	3,483	6,057	6,449	17,442
	<u>TOTALS</u>	20,455	35,629	51,006	42,894	149,984
6	<u>BIOLOGICAL & MEDICAL SCIENCES</u>					
60100	BIOCHEMISTRY	2,348	2,720	3,045	2,448	10,561
60200	GENETIC ENGINEERING & MOLECULAR BIOLOGY	1	1	500	492	994
60300	BIOLOGY	1,252	1,244	1,494	2,011	6,001
60400	ANATOMY & PHYSIOLOGY	4,927	5,477	3,744	3,932	18,080
60500	MEDICINE & MEDICAL RESEARCH	4,611	7,199	8,645	10,137	30,592
60600	ECOLOGY	47	115	149	723	1,034
60700	RADIOBIOLOGY	1,095	1,642	1,691	925	5,353
60800	FOOD, FOOD SERVICE & NUTRITION	477	956	644	486	2,563
60900	HYGGIENE & SANITATION	130	145	191	84	550
61000	STRESS PHYSIOLOGY	1,149	4,074	3,152	1,222	9,597
61100	TOXICOLOGY	695	2,584	6,897	1,696	11,872
61200	MEDICAL FACILITIES, EQUIPMENT & SUPPLIES	635	2,518	4,608	1,050	8,811
61300	MICROBIOLOGY	3,521	3,466	2,498	1,963	11,448
61400	WEAPONS EFFECT(BIOLOGICAL)	1,027	769	1,124	197	3,117
61500	PHARMACOLOGY	2,823	3,033	5,454	1,620	12,930
	<u>TOTALS</u>	24,738	35,943	43,836	28,986	133,503

TECHNICAL REPORT SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
7		<u>CHEMISTRY</u>					
	70100	INDUSTRIAL CHEMISTRY & CHEMICAL PROCESSING	1,589	1,288	4,213	655	7,745
	70200	INORGANIC CHEMISTRY	3,426	3,949	7,254	9,606	24,235
	70300	ORGANIC CHEMISTRY	5,106	5,236	9,140	6,073	25,555
	70400	PHYSICAL CHEMISTRY	5,649	8,237	11,250	10,674	35,810
	70500	RADIATION & NUCLEAR CHEMISTRY	1,903	3,417	6,319	1,222	12,861
	70600	POLYMER CHEMISTRY	2,398	3,823	8,188	3,760	18,169
		<u>TOTALS</u>	<u>20,071</u>	<u>25,950</u>	<u>46,364</u>	<u>31,990</u>	<u>124,375</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
8		<u>EARTH SCIENCES & OCEANOGRAPHY</u>					
	80100	BIOLOGICAL OCEANOGRAPHY	1,854	3,220	6,418	394	11,886
	80200	CARTOGRAPHY & AERIAL PHOTOGRAPHY	2,976	4,412	7,114	1,133	15,635
	80300	PHYSICAL & DYNAMIC OCEANOGRAPHY	3,833	8,413	10,151	3,819	26,216
	80400	GEOMAGNETISM	1,913	2,951	6,105	209	11,178
	80500	GEODESY	1,991	3,965	7,461	700	14,117
	80600	GEOGRAPHY	1,357	2,718	5,871	1,572	11,518
	80700	GEOLOGY, GEOCHEMISTRY & MINERALOGY	2,662	5,017	7,179	1,280	16,138
	80800	HYDROLOGY, LIMNOLOGY & POTAMOGY	1,639	3,684	9,013	1,729	16,065
	80900	MINING ENGINEERING	1,314	2,873	5,924	144	10,255
	81000	SOIL MECHANICS	1,908	3,895	6,572	966	13,341
	81100	SEISMOLOGY	2,859	4,314	6,975	846	14,994
	81200	SNOW, ICE & PERMAFROST	507	1,311	986	804	3,608
		<u>TOTALS</u>	<u>24,813</u>	<u>46,773</u>	<u>79,769</u>	<u>13,596</u>	<u>164,951</u>

TECHNICAL REPORT SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
9		<u>ELECTROTECHNOLOGY & FLUIDICS</u>					
	90100	ELECTRICAL & ELECTRONIC EQUIPMENT	23,259	25,268	13,597	11,408	73,532
	90200	FLUIDICS & FLUERICS	272	542	178	68	1,060
	90300	LASERS & MASERS	2,925	9,080	7,150	4,407	23,562
	90400	LINE, SURFACE & BULK ACOUSTIC WAVE DEVICES	10	564	327	115	1,006
	90500	ELECTROOPTICAL & OPTOELECTRONIC DEVICES	1,529	1,673	965	2,558	6,725
	90600	ACOUSTOOPTIC & OPTOACOUSTIC DEVICES	1	57	142	330	530
	90700	ELECTROMAGNETIC SHIELDING	28	75	191	592	886
		<u>TOTALS</u>	<u>28,024</u>	<u>37,259</u>	<u>22,550</u>	<u>19,478</u>	<u>107,311</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
10		<u>POWER PRODUCTION & ENERGY CONVERSION</u>					
	100100	NON-ELECTRIC ENERGY CONVERSION	1,009	380	330	190	1,909
	100200	ELECTRIC POWER PRODUCTION & DISTRIBUTION	3,911	2,833	2,547	1,255	10,546
	100300	ELECTROCHEMICAL ENERGY STORAGE	1,098	1,399	956	592	4,045
	100400	ENERGY STORAGE	142	125	150	86	503
		<u>TOTALS</u>	<u>6,160</u>	<u>4,737</u>	<u>3,983</u>	<u>2,123</u>	<u>17,003</u>

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
11	<u>MATERIALS</u>					
110100	ADHESIVES, SEALS & BINDERS	566	899	677	729	2,871
110200	CERAMICS, REFRACTORIES & GLASS	1,893	2,661	2,028	2,048	8,630
110201	REFRACTORY FIBERS	213	295	213	286	1,007
110300	COATINGS, COLORANTS & FINISHES	1,283	1,966	1,772	1,881	6,902
110400	LAMINATES & COMPOSITE MATERIALS	1,733	3,987	4,589	6,187	16,496
110500	TEXTILES	620	950	666	470	2,706
110600	METALLURGY & METALLOGRAPHY	3,499	4,804	4,874	2,297	15,474
110601	PROPERTIES OF METALS & ALLOYS	2,256	3,189	3,199	2,818	11,462
110602	FABRICATION METALLURGY	2,689	3,224	2,890	1,022	9,825
110700	MISCELLANEOUS MATERIALS	1,149	781	415	718	3,063
110800	LUBRICANTS & HYDRAULIC FLUIDS	877	1,345	740	547	3,509
110900	PLASTICS	2,212	2,594	3,277	2,083	10,166
111000	ELASTOMERS	663	575	767	537	2,542
111100	SOLVENTS, CLEANERS & ABRASIVES	116	129	91	204	540
111200	WOOD, PAPER & RELATED FORESTRY PRODUCTS	247	385	217	149	998
	<u>TOTALS</u>	20,016	27,784	26,415	21,976	96,191
12	<u>MATHEMATICAL & COMPUTER SCIENCES</u>					
120100	NUMERICAL MATHEMATICS	1,651	3,855	6,504	3,140	15,150
120200	THEORETICAL MATHEMATICS	2,623	4,997	4,073	1,063	12,756
120300	STATISTICS & PROBABILITY	2,376	6,221	7,304	2,738	18,639
120400	OPERATIONS RESEARCH	3,170	3,580	1,650	2,156	10,556
120500	COMPUTER PROGRAMMING & SOFTWARE	4,562	14,807	15,121	15,901	50,391
120600	COMPUTER HARDWARE	4,285	10,382	7,925	2,786	25,378
120700	COMPUTER SYSTEMS	547	1,543	2,277	4,426	8,793
120800	COMPUTER SYSTEMS MANAGEMENT & STANDARDS	5	276	156	604	1,041
120900	CYBERNETICS	1,339	2,995	2,574	3,868	10,776
	<u>TOTALS</u>	20,558	48,656	47,584	36,682	153,480

TECHNICAL REPORT SUBJECT FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
13	<u>MECHANICAL, INDUSTRIAL, CIVIL & MARINE ENGINEERING</u>					
130100	AIR CONDITIONING, HEATING, LIGHTING & VENTILATING	1,293	1,908	1,698	1,454	6,353
130200	CIVIL ENGINEERING	719	4,534	8,285	2,684	16,222
130300	CONSTRUCTION EQUIPMENT, MATERIALS & SUPPLIES	341	1,255	1,122	640	3,358
130400	CONTAINERS AND PACKAGING	829	1,368	635	1,597	4,429
130500	COUPLERS, FASTENERS & JOINTS	870	1,239	928	731	3,768
130600	SURFACE TRANSPORTATION & EQUIPMENT	1,857	2,820	2,855	1,857	9,389
130601	SURFACE EFFECT VEHICLES & AMPHIBIOUS VEHICLES	411	818	312	82	1,623
130700	HYDRAULIC & PNEUMATIC EQUIPMENT	880	989	754	719	3,342
130800	MANUFACTURING & INDUSTRIAL ENGINEERING & CONTROL	3,069	4,255	4,216	3,273	14,813
130900	MACHINERY & TOOLS	1,348	2,490	1,786	1,502	7,126
131000	MARINE ENGINEERING	4,099	7,204	5,294	4,805	21,402
131001	SUBMARINE ENGINEERING	1,828	1,857	1,803	1,883	7,371
131100	PUMPS, FILTERS, PIPES, TUBING, FITTINGS, & VALVES	2,028	1,403	864	670	4,965
131200	SAFETY ENGINEERING	805	1,760	1,597	1,460	5,622
131300	STRUCTURAL ENGINEERING & BUILDING TECHNOLOGY	2,621	2,921	2,292	1,362	9,196
		22,998	36,821	34,441	24,719	118,979

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
14	<u>TEST EQUIPMENT, RESEARCH FACILITIES & REPROGRAPHY</u>					
140100	HOLOGRAPHY	109	314	318	315	1,056
140200	TEST FACILITIES, EQUIPMENT & METHODS	8,112	11,892	11,780	4,942	36,726
140300	RECORDING & PLAYBACK DEVICES	451	575	416	1,222	2,664
140400	PHOTOGRAPHY	1,150	1,270	649	822	3,891
140500	PRINTING & GRAPHIC ARTS	320	355	441	288	1,404
	<u>TOTAL</u>	10,142	14,406	13,604	7,589	45,741

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
15	<u>MILITARY SCIENCES</u>					
150100	MILITARY FORCES & ORGANIZATIONS	35	181	915	6,277	7,408
150200	CIVIL DEFENSE	521	577	236	139	1,473
150300	DEFENSE SYSTEMS	1,302	1,869	1,762	2,553	7,486
150301	ANTIMISSILE DEFENSE SYSTEMS	2,733	5,105	3,033	2,081	12,952
150302	ANTIAIRCRAFT DEFENSE SYSTEMS	2,340	1,968	797	463	5,568
150303	ANTISATELLITE DEFENSE SYSTEMS	160	223	209	101	693
150400	MILITARY INTELLIGENCE	3,844	3,262	1,857	2,072	11,035
150500	LOGISTICS, MILITARY FACILITIES & SUPPLIES	2,592	5,264	7,568	9,882	25,306
150600	MILITARY OPERATIONS, STRATEGY & TACTICS	8,174	9,002	10,124	10,149	37,449
150601	NAVAL SURFACE WARFARE	633	1,237	1,378	1,144	4,392
150602	UNDERSEA & ANTISUBMARINE WARFARE	1,875	3,514	1,702	1,566	8,657
150603	CHEMICAL, BIOLOGICAL & RADIOLOGICAL WARF	6,687	7,156	5,908	4,227	23,978
150604	NUCLEAR WARFARE	1,809	1,579	1,416	886	5,690
150605	SPACE WARFARE	104	72	128	165	469
150606	LAND MINE WARFARE	50	88	283	657	1,078
150607	UNCONVENTIONAL WARFARE	1,855	1,240	525	674	4,294
	<u>TOTALS</u>	34,714	42,337	37,841	43,036	157,928

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
16	<u>GUIDED MISSILE TECHNOLOGY</u>					
160100	GUIDED MISSILE LAUNCHING & BASING SUPPOR	7,207	1,281	1,597	705	10,790
160200	GUIDED MISSILE TRAJECTORIES, ACCURACY & B	2,892	837	574	524	4,827
160201	GUIDED MISSILE DYNAMICS, CONFIGURATIONS	1,223	719	440	308	2,690
160300	GUIDED MISSILE WARHEADS AND FUZES	4,205	1,227	724	349	6,505
160400	GUIDED MISSILES	15,422	2,167	2,120	1,517	21,226
160401	AIR & SPACE-LAUNCHED GUIDED MISSILES	2,511	3,160	3,067	1,329	10,067
160402	SURFACE-LAUNCHED GUIDED MISSILES	10,248	5,541	2,922	1,414	20,125
160403	UNDERWATER-LAUNCHED GUIDED MISSILES	544	693	190	114	1,541
160500	GUIDED MISSILE REENTRY VEHICLES	2,778	3,301	1,159	400	7,638
	<u>TOTAL</u>	47,030	18,926	12,793	6,660	85,409

TECHNICAL REPORT SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
17		<u>NAVIGATION, DETECTION & COUNTERMEASURES</u>					
	170100	ACOUSTIC DETECTION & DETECTORS	5,035	7,336	3,806	3,842	20,019
	170200	NON-ACOUSTIC & NON-MAGNETIC SUBMARINE D	1	7	43	47	98
	170300	DIRECTION FINDING	915	879	527	164	2,485
	170400	COUNTERMEASURES	3,078	2,619	3,382	1,983	11,062
	170401	RADIO COUNTERMEASURES	795	728	423	368	2,314
	170402	ACOUSTIC COUNTERMEASURES	46	209	83	156	494
	170403	RADAR COUNTERMEASURES	4,849	2,581	1,024	992	9,446
	170404	OPTICAL COUNTERMEASURES	232	1,053	919	975	3,179
	170500	OPTICAL DETECTION & DETECTORS	3,168	4,475	2,442	2,425	12,510
	170501	INFRARED DETECTION & DETECTORS	4,617	6,249	4,215	2,867	17,948
	170502	ULTRAVIOLET DETECTION & DETECTORS	427	288	164	132	1,011
	170600	MAGNETIC & ELECTRIC FIELD DETECTION & DETE	464	537	447	358	1,806
	170700	NAVIGATION & GUIDANCE	647	834	770	1,465	3,716
	170701	LAND & RIVERINE NAVIGATION & GUIDANCE	154	118	87	170	529
	170702	UNDERWATER & MARINE NAVIGATION & GUIDAN	193	244	180	717	1,334
	170703	AIR NAVIGATION & GUIDANCE	5,134	3,211	2,105	1,447	11,897
	170704	SPACE NAVIGATION & GUIDANCE	930	241	145	158	1,474
	170800	MISCELLANEOUS DETECTION & DETECTORS	8	15	181	593	797
	170900	ACTIVE & PASSIVE RADAR DETECTION & EQUIPM	20,231	13,458	8,282	5,791	47,762
	171000	SEISMIC DETECTION & DETECTORS	537	1,204	380	432	2,553
	171100	TARGET DIRECTION, RANGE & POSITION FINDING	125	144	605	1,344	2,218
		<u>TOTAL</u>	<u>51,586</u>	<u>46,430</u>	<u>30,210</u>	<u>26,426</u>	<u>154,652</u>

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
18		NUCLEAR SCIENCE AND TECHNOLOGY					
	180100	FUSION DEVICES (THERMONUCLEAR)	60	245	297	272	874
	180200	ISOTOPIES	34	35	28	398	495
	180300	NUCLEAR EXPLOSION & DEVICES(NONMILITARY)	229	397	144	114	884
	180400	NUCLEAR INSTRUMENTATION	815	659	393	701	2,568
	180500	NUCLEAR POWER PLANTS & FUSION REACTOR EN	382	215	289	219	1,105
	180501	NUCLEAR FISSION REACTORS(POWER)	53	52	107	98	310
	180502	NUCLEAR FISSION REACTOR(NON-POWER)	82	83	55	17	237
	180600	NUCLEAR RADIATION SHIELDING,PROTECTION & S	520	1,503	858	377	3,258
	180700	RADIOACTIVITY, RADIOACTIVE WASTES & FISSION	1,717	2,088	680	507	4,992
	180800	SNAP(SYSTEMS FOR NUCLEAR AUXILIARY POWER)	75	53	17	36	181
	180900	FISSION REACTOR PHYSICS	94	107	60	96	357
	181000	FISSION REACTOR MATERIALS	212	180	82	97	571
		TOTALS	4,273	5,617	3,010	2,932	15,832

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
19		<u>ORDNANCE</u>					
	190100	AMMUNITION & EXPLOSIVES	15,656	11,678	9,442	5,966	42,742
	190101	PYROTECHNICS	1,197	1,417	1,168	975	4,757
	190200	AERIAL BOMBS	953	2,143	957	890	4,943
	190300	COMBAT VEHICLES	1,813	2,365	3,818	1,729	9,725
	190400	ARMOR	2,507	1,419	1,579	607	6,112
	190500	FIRE CONTROL & BOMBING SYSTEMS	6,075	4,459	2,391	2,048	14,973
	190600	GUNS	3,753	3,197	3,538	2,533	13,021
	190700	ROCKETS	3,773	1,774	740	635	6,922
	190800	UNDERWATER ORDNANCE	1,404	622	447	277	2,750
	190801	TORPEDOES	1,288	1,312	1,013	536	4,149
	190900	EXPLOSIONS	2,303	2,283	1,613	1,127	7,326
	191000	BALLISTICS	2,384	3,227	1,535	1,142	8,288
	191100	NUCLEAR WEAPONS	3,498	2,851	2,113	1,896	10,358
	191200	DIRECTED ENERGY WEAPONS	21	233	452	516	1,222
	191300	GUIDED MUNITIONS	20	57	152	360	589
		<u>TOTAL</u>	<u>46,645</u>	<u>39,037</u>	<u>30,958</u>	<u>21,237</u>	<u>137,877</u>

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
20		<u>PHYSICS</u>					
	200100	ACOUSTICS	3,132	5,951	4,081	3,622	16,786
	200200	CRYSTALLOGRAPHY	2,158	2,453	2,194	2,905	9,710
	200300	ELECTRICITY & MAGNETISM	3,145	3,545	4,534	6,214	17,438
	200400	FLUID MECHANICS	10,233	10,702	8,339	6,619	35,893
	200500	ATOMIC & MOLECULAR PHYSICS & SPECTROSCOPY	4,240	6,144	4,778	5,324	20,486
	200600	OPTICS	3,559	5,655	5,975	6,770	21,959
	200601	FIBER OPTICS & INTEGRATED OPTICS	142	552	939	1,276	2,909
	200700	PARTICLE ACCELERATORS	352	577	1,346	879	3,154
	200800	NUCLEAR PHYSICS & ELEMENTARY PARTICLE PHYS	4,378	3,258	1,872	2,054	11,562
	200900	PLASMA PHYSICS & MAGNETOHYDRODYNAMICS	2,722	3,814	2,339	1,752	10,627
	201000	QUANTUM THEORY & RELATIVITY	1,550	1,187	882	1,033	4,652
	201100	MECHANICS	4,780	6,616	6,860	5,070	23,326
	201200	SOLID STATE PHYSICS	4,275	8,568	4,756	2,437	20,036
	201300	THERMODYNAMICS	2,588	2,155	1,961	3,964	10,668
	201400	RADIOFREQUENCY WAVE PROPAGATION	3,616	4,149	4,149	3,048	14,962
	201500	ELECTROMAGNETIC PULSES	192	644	932	414	2,182
		<u>TOTALS</u>	<u>51,062</u>	<u>65,970</u>	<u>55,937</u>	<u>53,381</u>	<u>226,350</u>

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
21		<u>PROPULSION, ENGINES & FUELS</u>					
	210100	AIR BREATHING ENGINES (UN ONVENTI NAL)	265	97	229	151	742
	210200	COMBUSTION & IGNITION	2,072	2,382	2,679	1,957	9,090
	210300	ELECTRIC & ION PROPULSION	285	262	197	229	973
	210400	FUELS	1,529	1,368	1,744	1,475	6,116
	210500	JET & GAS TURBINE ENGINES	4,717	4,981	4,155	2,830	16,683
	210600	NUCLEAR PROPULSION	714	101	55	85	955
	210700	RECIPROCATING & ROTATING ENGINES	517	599	691	562	2,369
	210800	ROCKET ENGINES	5,500	1,056	1,174	729	8,459
	210801	LIQUID PROPELLANT ROCKET ENGINES	2,415	683	381	241	3,720
	210802	SOLID PROPELLANT ROCKET ENGINES	3,707	2,175	1,547	547	7,976
	210900	ROCKET PROPELLANTS	728	288	338	407	1,761
	210901	LIQUID ROCKET PROPELLANTS	3,349	611	392	283	4,635
	210902	SOLID ROCKET PROPELLANTS	6,216	1,976	1,393	523	10,108
		<u>TOTAL</u>	<u>32,014</u>	<u>16,579</u>	<u>14,975</u>	<u>10,019</u>	<u>73,587</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
22		<u>SPACE TECHNOLOGY</u>					
	220100	ASTRONAUTICS	1,052	485	961	1,189	3,687
	220200	UNMANNED SPACECRAFT	7,200	3,597	3,361	2,101	16,259
	220300	SPACECRAFT TRAJECTORIES & REENTRY	2,153	867	542	414	3,976
	220400	GROUND SUPPORT SYSTEMS & FACILITIES F	3,678	349	155	211	4,393
	220500	MANNED SPACECRAFT	1,604	487	333	803	3,227
		<u>TOTAL</u>	<u>15,687</u>	<u>5,785</u>	<u>5,352</u>	<u>4,718</u>	<u>31,542</u>

TECHNICAL REPORTS SUBJECT FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>23</u>	<u>BIOTECHNOLOGY</u>					
230100	BIOMEDICAL INSTRUMENTATION & BIOENGINEERING	147	368	164	134	813
230200	HUMAN FACTORS ENGINEERING & MAN MACHINE S	1,209	2,077	2,873	1,633	7,792
230300	BIONICS	650	762	633	250	2,295
230400	PROTECTIVE EQUIPMENT	840	1,171	1,329	1,418	4,758
230500	LIFE SUPPORT SYSTEMS	601	711	519	448	2,279
230600	ESCAPE, RESCUE & SURVIVAL	260	698	541	538	2,037
	<u>TOTALS</u>	<u>3,707</u>	<u>5,787</u>	<u>6,059</u>	<u>4,421</u>	<u>19,974</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>24</u>	<u>ENVIRONMENTAL POLLUTION & CONTROL</u>					
240100	AIR POLLUTION & CONTROL	112	971	548	782	2,413
240200	NOISE POLLUTION & CONTROL	-	22	55	321	398
240300	SOLID WASTES POLLUTION & CONTROL	-	1	342	2,125	2,468
240400	WATER POLLUTION & CONTROL	115	2,005	1,529	2,727	6,376
240500	PESTICIDES POLLUTION & CONTROL	4	85	58	195	342
240600	RADIATION POLLUTION & CONTROL	17	19	129	321	486
240700	ENVIRONMENTAL HEALTH & SAFETY	64	475	542	1,796	2,877
	<u>TOTALS</u>	<u>312</u>	<u>3,578</u>	<u>3,203</u>	<u>8,267</u>	<u>15,360</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>25</u>	<u>COMMUNICATIONS</u>					
250100	TELEMETRY	1,013	547	403	480	2,443
250200	RADIO COMMUNICATIONS	6,377	4,818	4,113	3,878	19,186
250300	NON-RADIO COMMUNICATIONS	2,605	5,558	5,267	754	14,184
250400	VOICE COMMUNICATIONS	570	1,227	950	548	3,295
250500	COMMAND, CONTROL & COMMUNICATIONS SYSTEM	760	1,944	3,985	3,703	10,392
	<u>TOTALS</u>	<u>11,325</u>	<u>14,094</u>	<u>14,718</u>	<u>9,363</u>	<u>49,500</u>

Technical Reports Classified Fields & Groups 1960-1997

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

FIELD GROUP	NAME	1960-1970	1970-1980	1980-1990	1990-1997	TOTALS
1	AVIATION TECHNOLOGY					
10100	AERODYNAMICS	191	42	79	267	579
10200	MILITARY AIRCRAFT OPERATIONS	656	105	215	162	1,138
10300	AIRCRAFT	945	248	646	208	1,717
10301	HELICOPTERS	437	520	514	191	1,662
10302	BOMBERS	1,270	707	390	129	2,496
10303	ATTACK & FIGHTER AIRCRAFT	1,476	1,302	950	425	4,158
10304	PATROL & R & RECONNAISSANCE AIRCRAFT	603	477	396	105	1,581
10305	TRANSPORT AIRCRAFT	290	198	125	57	670
10306	TRAINING AIRCRAFT	100	37	18	-	2,251
10307	V/STOL	304	214	118	17	653
10308	GLIDERS & PARACHUTES	53	35	16	15	119
10309	CIVILIAN AIRCRAFT	16	6	8	3	772
10310	PILOTLESS AIRCRAFT	107	253	134	41	535
10311	LIGHTER-THAN-AIR AIRCRAFT	36	23	30	8	97
10312	RESEARCH & EXPERIMENTAL AIRCRAFT	105	22	24	745	632
10400	FLIGHT CONTROL & INSTRUMENTATION	665	63	69	39	836
10500	TERMINAL FLIGHT FACILITIES	254	157	127	20	552
10600	COMMERCIAL & GENERAL AVIATION	45	17	16	4	1,394
	TOTALS	7,553	4,426	3,875	2,436	18,290

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

FIELD	GROUP	NAME	1960-1970	1970-1980	1980-1990	1990-1997	TOTALS
2		<u>AGRICULTURE</u>					
	20100	AGRICULTURAL CHEMISTRY	36	13	4	2	55
	20200	AGRICULTURAL ECONOMICS	48	16	7	0	71
	20300	AGRICULTURAL ENGINEERING	41	17	9	0	67
	20400	AGRONOMY, HORTICULTURE, AQUICULTURE	37	17	5	2	61
	20500	ANIMAL HUSBANDRY, & VETERINARY MED	59	26	11	0	96
	20600	FORESTRY	43	19	8	0	70
		<u>TOTALS</u>	264	108	44	4	420
3		<u>ASTRONOMY & ASTROPHYSICS</u>					
	30100	ASTRONOMY	64	26	7	3	100
	30200	ASTROPHYSICS	79	43	8	5	135
	30300	CELESTIAL MECHANICS	49	17	7	1	74
		<u>TOTALS</u>	192	86	22	9	309
4		<u>ATMOSPHERIC SCIENCES</u>					
	40100	ATMOSPHERIC PHYSICS	248	408	172	39	867
	40200	METEOROLOGY	358	114	95	49	616
		<u>TOTALS</u>	606	522	267	88	1,483

TECHNICAL REPORT CLASSIFIED FIELDS AND GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>5</u>	<u>BEHAVIOR & SOCIAL SCIENCE</u>					
50100	ADMINISTRATION & MANAGEMENT	998	274	599	192	2,063
50200	INFORMATION SCIENCE	562	1,054	709	153	2,478
50300	ECONOMICS AND COST ANALYSIS	352	402	232	100	1,086
50400	GOVERNMENT & POLITICAL SCIENCE	347	209	185	216	957
50500	SOCIOLOGY & LAW	167	50	33	11	261
50600	HUMANITIES AND HISTORY	419	351	167	7	944
50700	LINGUISTICS	5	4	5	1	15
50800	PSYCHOLOGY	260	63	38	4	365
50900	PERSONNEL MANAGEMENT & LABOR RELATIONS	281	126	99	42	548
	<u>TOTALS</u>	<u>3,391</u>	<u>2,533</u>	<u>2,067</u>	<u>726</u>	<u>8,717</u>
<u>6</u>	<u>BIOLOGICAL & MEDICAL SCIENCES</u>					
60100	BIOCHEMISTRY	96	17	10	9	132
60200	GENETIC ENGINEERING & MOLECULAR BIOLOGY	1	-	4	2	7
60300	BIOLOGY	53	10	6	3	72
60400	ANATOMY & PHYSIOLOGY	294	139	31	4	468
60500	MEDICINE & MEDICAL RESEARCH	88	74	63	63	288
60600	ECOLOGY	7	6	1	-	14
60700	RADIOBIOLOGY	96	92	75	18	281
60800	FOOD, FOOD SERVICE & NUTRITION	37	3	3	1	44
60900	HYGGIENE & SANITATION	34	1	3	-	38
61000	STRESS PHYSIOLOGY	41	40	36	8	125
61100	TOXICOLOGY	98	86	130	42	356
61200	MEDICAL FACILITIES, EQUIPMENT & SUPPLIES	27	110	55	22	214
61300	MICROBIOLOGY	187	81	52	11	331
61400	WEAPONS EFFECT(BIOLOGICAL)	186	103	77	15	381
61500	PHARMACOLOGY	287	110	111	25	533
	<u>TOTALS</u>	<u>1,532</u>	<u>872</u>	<u>657</u>	<u>223</u>	<u>3,284</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>7</u>	<u>CHEMISTRY</u>					
70100	INDUSTRIAL CHEMISTRY & CHEMICAL PROCESSING	303	29	17	12	361
70200	INORGANIC CHEMISTRY	265	133	114	26	538
70300	ORGANIC CHEMISTRY	558	113	68	30	769
70400	PHYSICAL CHEMISTRY	525	115	92	25	757
70500	RADIATION & NUCLEAR CHEMISTRY	168	105	35	1	309
70600	POLYMER CHEMISTRY	280	107	80	12	479
	<u>TOTALS</u>	<u>2,099</u>	<u>602</u>	<u>406</u>	<u>106</u>	<u>3,213</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>8</u>	<u>EARTH SCIENCES & OCEANOGRAPHY</u>					
80100	BIOLOGICAL OCEANOGRAPHY	258	87	95	9	449
80200	CARTOGRAPHY & AERIAL PHOTOGRAPHY	787	198	122	97	1,204
80300	PHYSICAL & DYNAMIC OCEANOGRAPHY	559	431	320	155	1,465
80400	GEOMAGNETISM	312	115	40	8	475
80500	GEODESY	224	128	86	7	445
80600	GEOGRAPHY	175	111	55	31	372
80700	GEOLOGY, GEOCHEMISTRY & MINERALOGY	274	110	64	15	463
80800	HYDROLOGY, LIMNOLOGY & POTAMOGY	258	89	45	2	394
80900	MINING ENGINEERING	189	101	75	1	366
81000	SOIL MECHANICS	281	117	49	13	460
81100	SEISMOLOGY	444	121	101	20	686
81200	SNOW, ICE & PERMAFROST	16	26	33	30	105
	<u>TOTALS</u>	<u>3,777</u>	<u>1,634</u>	<u>1,085</u>	<u>388</u>	<u>6,884</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>9</u>		<u>ELECTROTECHNOLOGY & FLUIDICS</u>					
	90100	ELECTRICAL & ELECTRONIC EQUIPMENT	4,420	1,312	525	178	6,435
	90200	FLUIDICS & FLUERICS	8	26	2	-	36
	90300	LASERS & MASERS	597	1,428	1,070	156	3,251
	90400	LINE, SURFACE & BULK ACOUSTIC WAVE DEVICES	-	5	4	1	10
	90500	ELECTROOPTICAL & OPTOELECTRONIC DEVICES	360	142	75	80	657
	90600	ACOUSTOOPTIC & OPTOACOUSTIC DEVICES	1	2	12	25	40
	90700	ELECTROMAGNETIC SHIELDING	15	13	34	138	200
		<u>TOTALS</u>	<u>5,401</u>	<u>2,928</u>	<u>1,722</u>	<u>578</u>	<u>10,629</u>

<u>FIELD</u>	<u>GROUP</u>	<u>POWER PRODUCTION & ENERGY CONVERSION</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>10</u>		<u>NON-ELECTRIC ENERGY CONVERSION</u>					
	100100	NON-ELECTRIC ENERGY CONVERSION	340	17	4	6	367
	100200	ELECTRIC POWER PRODUCTION & DISTRIBUTION	1,183	121	96	55	1,455
	100300	ELECTROCHEMICAL ENERGY STORAGE	131	62	19	8	220
	100400	ENERGY STORAGE	37	12	8	-	57
		<u>TOTALS</u>	<u>1,691</u>	<u>212</u>	<u>127</u>	<u>69</u>	<u>2,099</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
11	<u>MATERIALS</u>					
110100	ADHESIVES, SEALS & BINDERS	63	32	18	15	128
110200	CERAMICS, REFRACTORIES & GLASS	213	80	89	49	431
110201	REFRACTORY FIBERS	16	15	5	2	38
110300	COATINGS, COLORANTS & FINISHES	126	134	124	66	450
110400	LAMINATES & COMPOSITE MATERIALS	203	390	328	124	1,045
110500	TEXTILES	129	28	35	7	199
110600	METALLURGY & METALLOGRAPHY	310	147	134	68	659
110601	PROPERTIES OF METALS & ALLOYS	122	55	73	35	285
110602	FABRICATION METALLURGY	94	66	41	8	209
110700	MISCELLANEOUS MATERIALS	169	45	11	10	235
110800	LUBRICANTS & HYDRAULIC FLUIDS	52	20	4	2	78
110900	PLASTICS	244	74	62	16	396
111000	ELASTOMERS	100	23	25	6	154
111100	SOLVENTS, CLEANERS & ABRASIVES	4	2	1	-	7
111200	WOOD, PAPER & RELATED FORESTRY PRODUCTS	30	2	2	-	34
	<u>TOTALS</u>	1,875	1,113	952	408	4,348

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
12	<u>MATHEMATICAL & COMPUTER SCIENCES</u>					
120100	NUMERICAL MATHEMATICS	93	90	166	14	363
120200	THEORETICAL MATHEMATICS	16	40	65	7	128
120300	STATISTICS & PROBABILITY	96	105	145	27	373
120400	OPERATIONS RESEARCH	887	75	72	39	1,073
120500	COMPUTER PROGRAMMING & SOFTWARE	201	1,281	854	600	2,936
120600	COMPUTER HARDWARE	138	769	314	43	1,264
120700	COMPUTER SYSTEMS	32	79	111	76	298
120800	COMPUTER SYSTEMS MANAGEMENT & STANDAR	-	3	7	18	28
120900	CYBERNETICS	161	207	57	55	480
	<u>TOTALS</u>	1,624	2,649	1,791	879	6,943

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
13		MECHANICAL, INDUSTRIAL, CIVIL & MAR E ENGINEERING					
	130100	AIR CONDITIONING, HEATING, LIGHTING & VENTILATING	127	74	50	23	274
	130200	CIVIL ENGINEERING	114	51	102	22	289
	130300	CONSTRUCTION EQUIPMENT, MATERIALS & SUPPLIES	17	12	25	5	59
	130400	CONTAINERS AND PACKAGING	60	51	30	10	151
	130500	COUPLERS, FASTNERS & JOINTS	53	38	35	13	139
	130600	SURFACE TRANSPORTATION & EQUIPMENT	182	97	95	40	414
	130601	SURFACE EFFECT VEHICLES & AMPHIBIOUS VEHICLES	62	114	53	4	233
	130700	HYDRAULIC & PNEUMATIC EQUIPMENT	45	28	27	27	127
	130800	MANUFACTURING & INDUSTRIAL ENGINEERING & CONT	299	63	89	30	481
	130900	MACHINERY & TOOLS	81	38	32	15	166
	131000	MARINE ENGINEERING	1,269	1,166	870	1,446	4,751
	131001	SUBMARINE ENGINEERING	1,159	1,057	992	780	3,988
	131100	PUMPS, FILTERS, PIPES, TUBING, FITTINGS, & VALVES	101	39	23	51	214
	131200	SAFETY ENGINEERING	83	79	44	32	238
	131300	STRUCTURAL ENGINEERING & BUILDING TECHNOLOGY	418	116	119	31	684
			<u>4,070</u>	<u>3,023</u>	<u>2,586</u>	<u>2,529</u>	<u>12,208</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
14		TEST EQUIPMENT, RESEARCH FACILITIES & REPROGRAPHY					
	140100	HOLOGRAPHY	11	2	4	7	24
	140200	TEST FACILITIES, EQUIPMENT & METHODS	1,266	517	681	136	2,600
	140300	RECORDING & PLAYBACK DEVICES	95	37	17	36	185
	140400	PHOTOGRAPHY	257	86	17	10	370
	140500	PRINTING & GRAPHIC ARTS	120	17	6	1	144
		TOTAL	<u>1,749</u>	<u>659</u>	<u>725</u>	<u>190</u>	<u>3,323</u>

CLASSIFIED FIELDS AND GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
15		<u>MILITARY SCIENCES</u>					
	150100	MILITARY FORCES & ORGANIZATIONS	30	54	126	203	413
	150200	CIVIL DEFENSE	93	42	32	13	180
	150300	DEFENSE SYSTEMS	1,284	1,601	1,263	676	4,824
	150301	ANTIMISSILE DEFENSE SYSTEMS	2,257	3,876	2,086	833	9,052
	150302	ANTIAIRCRAFT DEFENSE SYSTEMS	1,568	1,267	550	166	3,551
	150303	ANTISATELLITE DEFENSE SYSTEMS	141	188	169	41	539
	150400	MILITARY INTELLIGENCE	2,467	1,821	907	523	5,718
	150500	LOGISTICS, MILITARY FACILITIES & SUPPLIES	760	497	708	307	2,272
	150600	MILITARY OPERATIONS, STRATEGY & TACTICS	3,846	2,687	3,193	1,306	11,032
	150601	NAVAL SURFACE WARFARE	366	587	652	591	2,196
	150602	UNDERSEA & ANTISUBMARINE WARFARE	1,373	2,340	1,139	874	5,726
	150603	CHEMICAL, BIOLOGICAL & RADIOLOGICAL WARF	3,055	1,421	999	416	5,891
	150604	NUCLEAR WARFARE	1,556	1,095	869	284	3,804
	150605	SPACE WARFARE	89	61	55	43	248
	150606	LAND MINE WARFARE	25	37	77	82	221
	150607	UNCONVENTIONAL WARFARE	571	382	95	27	1,075
		<u>TOTALS</u>	<u>19,481</u>	<u>17,956</u>	<u>12,920</u>	<u>6,385</u>	<u>56,742</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
16		<u>GUIDED MISSILE TECHNOLOGY</u>					
	160100	GUIDED MISSILE LAUNCHING & BASING SUPPORT	2,429	311	362	157	3,259
	160200	GUIDED MISSILE TRAJECTORIES, ACCURACY & B	1,275	390	246	164	2,075
	160201	GUIDED MISSILE DYNAMICS, CONFIGURATIONS	478	182	96	64	820
	160300	GUIDED MISSILE WARHEADS AND FUZES	1,837	651	379	173	3,040
	160400	GUIDED MISSILES	4,474	841	802	413	6,530
	160401	AIR & SPACE-LAUNCHED GUIDED MISSILES	1,347	1,396	1,171	610	4,524
	160402	SURFACE-LAUNCHED GUIDED MISSILES	4,655	3,227	1,690	560	10,132
	160403	UNDERWATER-LAUNCHED GUIDED MISSILES	356	320	99	59	834
	160500	GUIDED MISSILE REENTRY VEHICLES	1,784	2,232	754	186	4,976
		<u>TOTAL</u>	<u>18,635</u>	<u>9,570</u>	<u>5,599</u>	<u>2,386</u>	<u>36,190</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
17		<u>NAVIGATION, DETECTION & COUNTERMEASURES</u>					
	170100	ACOUSTIC DETECTION & DETECTORS	2897	3459	1763	1789	9908
	170200	NON-ACOUSTIC & NON-MAGNETIC SUBMARINE D	1	6	29	16	52
	170300	DIRECTION FINDING	550	291	182	33	1,056
	170400	COUNTERMEASURES	2,297	1,481	1,873	822	6,473
	170401	RADIO COUNTERMEASURES	714	449	246	114	1,523
	170402	ACOUSTIC COUNTERMEASURES	42	169	69	118	398
	170403	RADAR COUNTERMEASURES	4,235	1,869	675	526	7,305
	170404	OPTICAL COUNTERMEASURES	190	619	709	570	2,088
	170500	OPTICAL DETECTION & DETECTORS	1,455	1,725	673	303	4,156
	170501	INFRARED DETECTION & DETECTORS	2,358	2,609	1,800	628	7,395
	170502	ULTRAVIOLET DETECTION & DETECTORS	212	140	64	24	440
	170600	MAGNETIC & ELECTRIC FIELD DETECTION & DETE	246	220	160	96	722
	170700	NAVIGATION & GUIDANCE	549	435	292	168	1,444
	170701	LAND & RIVERINE NAVIGATION & GUIDANCE	138	85	13	1	237
	170702	UNDERWATER & MARINE NAVIGATION & GUIDAN	159	151	75	428	813
	170703	AIR NAVIGATION & GUIDANCE	4,277	969	715	216	6,177
	170704	SPACE NAVIGATION & GUIDANCE	537	69	68	20	694
	170800	MISCELLANEOUS DETECTION & DETECTORS	7	9	38	68	122
	170900	ACTIVE & PASSIVE RADAR DETECTION & EQUIPM	12,044	6,227	3,059	1,595	22,925
	171000	SEISMIC DETECTION & DETECTORS	149	135	67	46	397
	171100	TARGET DIRECTION, RANGE & POSITION FINDING	123	93	173	226	615
		<u>TOTAL</u>	<u>33,180</u>	<u>21,210</u>	<u>12,743</u>	<u>7,807</u>	<u>74,940</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
18		<u>NUCLEAR SCIENCE AND TECHNOLOGY</u>					
	180100	FUSION DEVICES (THERMONUCLEAR)	2	9	0	1	12
	180200	ISOTOPIES	19	13	5	10	47
	180300	NUCLEAR EXPLOSI N & DEVICES(NONMILITARY)	223	370	78	5	676
	180400	NUCLEAR INSTRUMENTATION	286	145	39	43	513
	180500	NUCLEAR POWER PLANTS & FUSION REACTOR EN	183	8	12	4	207
	180501	NUCLEAR FISSION REACTORS(POWER)	13	-	13	1	27
	180502	NUCLEAR FISSION REACTOR(NON-POWER)	18	2	-	1	21
	180600	NUCLEAR RADIATION SHIELDING,PROTECTION & S	287	561	326	81	1,255
	180700	RADIOACTIVITY, RADIOACTIVE WASTES & FISSION	761	942	181	17	1,901
	180800	SNAP(SYSTEMS FOR NUCLEAR AUXILIARY POWER)	22	2	1	15	40
	180900	FISSION REACTOR PHYSICS	10	-	-	1	11
	181000	FISSION REACTOR MATERIALS	76	3	-	18	97
		TOTALS	1,900	2,055	655	197	4,807

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
19		<u>ORDNANCE</u>					
	190100	AMMUNITION & EXPLOSIVES	3,560	2,427	1,621	742	8,350
	190101	PYROTECHNICS	327	198	359	184	1,068
	190200	AERIAL BOMBS	275	516	253	106	1,150
	190300	COMBAT VEHICLES	442	525	686	325	1,978
	190400	ARMOR	911	242	347	205	1,705
	190500	FIRE CONTROL & BOMBING SYSTEMS	2,574	1,455	750	566	5,345
	190600	GUNS	785	582	560	223	2,150
	190700	ROCKETS	890	338	158	84	1,470
	190800	UNDERWATER ORDNANCE	1,068	447	256	96	1,867
	190801	TORPEDOES	985	955	822	329	3,091
	190900	EXPLOSIONS	995	396	348	183	1,922
	191000	BALLISTICS	643	561	288	210	1,702
	191100	NUCLEAR WEAPONS	3,296	2,331	1,292	568	7,487
	191200	DIRECTED ENERGY WEAPONS	19	161	331	223	734
	191300	GUIDED MUNITIONS	20	37	80	123	260
		<u>TOTAL</u>	<u>16,790</u>	<u>11,171</u>	<u>8,151</u>	<u>4,167</u>	<u>40,279</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
20		PHYSICS					
200100		ACOUSTICS	987	1,434	720	550	3,691
200200		CRYSTALLOGRAPHY	65	15	16	1	97
200300		ELECTRICITY & MAGNETISM	341	165	167	73	746
200400		FLUID MECHANICS	1,432	563	477	208	2,680
200500		ATOMIC & MOLECULAR PHYSICS & SPECTROSCOPY	54	69	49	12	184
200600		OPTICS	527	498	465	140	1,630
200601		FIBER OPTICS & INTEGRATED OPTICS	9	12	43	40	104
200700		PARTICLE ACCELERATORS	69	49	108	19	245
200800		NUCLEAR PHYSICS & ELEMENTARY PARTICLE PHYS	1,095	370	89	20	1,574
200900		PLASMA PHYSICS & MAGNETOHYDRODYNAMICS	187	204	63	8	462
201000		QUANTUM THEORY & RELATIVITY	32	7	3	-	42
201100		MECHANICS	113	189	279	56	637
201200		SOLID STATE PHYSICS	155	84	71	9	319
201300		THERMODYNAMICS	168	98	63	79	408
201400		RADIOFREQUENCY WAVE PROPAGATION	908	701	473	155	2,237
201500		ELECTROMAGNETIC PULSES	55	151	246	97	549
		TOTALS	6,197	4,609	3,332	1,467	15,605

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
21		<u>PROPULSION, ENGINES & FUELS</u>					
	210100	AIR BREATHING ENGINES (UN CONVENTI NAL)	68	39	59	32	198
	210200	COMBUSTION & IGNITION	215	171	238	105	729
	210300	ELECTRIC & ION PROPULSION	59	13	16	4	92
	210400	FUELS	150	84	106	60	400
	210500	JET & GAS TURBINE ENGINES	966	482	390	383	2,221
	210600	NUCLEAR PROPULSION	510	18	10	13	551
	210700	RECIPROCATING & ROTATING ENGINES	73	22	23	16	134
	210800	ROCKET ENGINES	822	322	199	93	1,436
	210801	LIQUID PROPELLANT ROCKET ENGINES	473	159	85	40	757
	210802	SOLID PROPELLANT ROCKET ENGINES	806	625	321	67	1,819
	210900	ROCKET PROPELLANTS	114	85	71	39	309
	210901	LIQUID ROCKET PROPELLANTS	343	104	60	31	538
	210902	SOLID ROCKET PROPELLANTS	896	362	253	78	1,589
		<u>TOTAL</u>	<u>5,495</u>	<u>2,486</u>	<u>1,831</u>	<u>961</u>	<u>10,773</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
22		<u>SPACE TECHNOLOGY</u>					
	220100	ASTRONAUTICS	325	41	87	48	501
	220200	UNMANNED SPACECRAFT	2,575	873	810	179	4,437
	220300	SPACECRAFT TRAJECTORIES & REENTRY	540	106	42	19	707
	220400	GROUND SUPPORT SYSTEMS & FACILITIES F	1,007	33	18	25	1,083
	220500	MANNED SPACECRAFT	491	125	22	46	684
		<u>TOTAL</u>	<u>4,938</u>	<u>1,178</u>	<u>979</u>	<u>317</u>	<u>7,412</u>

TECHNICAL REPORTS CLASSIFIED FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>23</u>	<u>BIOTECHNOLOGY</u>					
230100	BIOMEDICAL INSTRUMENTATION & BIOENGINEERING	5	2	1	0	8
230200	HUMAN FACTORS ENGINEERING & MAN MACHINE S	135	115	148	36	434
230300	BIONICS	29	11	8	2	50
230400	PROTECTIVE EQUIPMENT	181	93	62	81	417
230500	LIFE SUPPORT SYSTEMS	184	19	32	19	254
230600	ESCAPE, RESCUE & SURVIVAL	55	40	14	21	130
	<u>TOTALS</u>	<u>589</u>	<u>280</u>	<u>265</u>	<u>159</u>	<u>1,293</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>24</u>	<u>ENVIRONMENTAL POLLUTION & CONTROL</u>					
240100	AIR POLLUTION & CONTROL	5	9	7	3	24
240200	NOISE POLLUTION & CONTROL	0	1	0	2	3
240300	SOLID WASTES POLLUTION & CONTROL	0	0	1	2	3
240400	WATER POLLUTION & CONTROL	2	9	6	8	25
240500	PESTICIDES POLLUTION & CONTROL	3	1	1	0	5
240600	RADIATION POLLUTION & CONTROL	8	1	2	3	14
240700	ENVIRONMENTAL HEALTH & SAFETY	0	3	2	7	12
	<u>TOTALS</u>	<u>18</u>	<u>24</u>	<u>19</u>	<u>25</u>	<u>86</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>25</u>	<u>COMMUNICATIONS</u>					
250100	TELEMETRY	225	46	41	28	340
250200	RADIO COMMUNICATIONS	2,647	1,060	992	350	5,049
250300	NON-RADIO COMMUNICATIONS	669	813	796	35	2,313
250400	VOICE COMMUNICATIONS	128	174	70	17	389
250500	COMMAND, CONTROL & COMMUNICATIONS SYSTEM	387	786	1,367	558	3,098
	<u>TOTALS</u>	<u>4,056</u>	<u>2,879</u>	<u>3,266</u>	<u>988</u>	<u>11,189</u>

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DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>1</u>		AVIATION TECHNOLOGY					
	10100	AERODYNAMICS	43,060	60,046	51,080	67,254	221,440
	10200	MILITARY AIRCRAFT OPERATIONS	8,714	16,072	35,410	66,927	127,123
	10300	AIRCRAFT	56,243	185,720	221,594	110,128	573,685
	10301	HELICOPTERS	43,565	137,676	113,423	51,918	346,582
	10302	BOMBERS	34,095	85,897	41,764	20,048	181,804
	10303	ATTACK & FIGHTER AIRCRAFT	52,102	199,475	128,240	60,553	440,370
	10304	PATRO & RECONNAISSANCE AIRCRAFT	21,992	59,627	34,422	10,711	126,752
	10305	TRANSPORT AIRCRAFT	29,309	55,545	35,813	23,230	143,897
	10306	TRAINING AIRCRAFT	3,429	10,217	9,758	3,891	27,295
	10307	V/STOL	26,224	46,048	29,137	5,788	107,197
	10308	GLIDERS & PARACHUTES	8,273	16,351	9,935	5,235	39,794
	10309	CIVILIAN AIRCRAFT	7,376	8,272	7,781	3,559	26,988
	10310	PILOTLESS AIRCRAFT	5,371	44,478	20,528	9,836	80,213
	10311	LIGHTER-THAN-AIR AIRCRAFT	4,223	10,438	7,042	1,721	23,424
	10312	RESEARCH & EXPERIMENTAL AIRCRAFT ¹	8,134	10,636	12,101	45,051	75,922
	10400	FLIGHT CONTROL & INSTRUMENTATION	16,516	34,148	39,812	29,405	119,881
	10500	TERMINAL FLIGHT FACILITIES	22,635	71,436	57,646	31,078	182,795
	10600	COMMERCIAL & GENERAL AVIATION	5,543	12,354	15,800	13,533	47,230
		TOTALS	396,804	1,064,436	871,286	559,866	2,892,392

DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
2	<u>AGRICULTURE</u>					
20100	AGRICULTURAL CHEMISTRY	6,957	4,084	4,654	3,101	18,796
20200	AGRICULTURAL ECONOMICS	7,330	4,585	3,606	907	16,428
20300	AGRICULTURAL ENGINEERING	6,141	7,344	4,696	686	18,867
20400	AGRONOMY, HORTICULTURE, AQUICULTURE	7,735	7,098	6,686	2,291	23,810
20500	ANIMAL HUSBANDRY, & VETERINARY MED	8,817	10,225	6,799	1,395	27,236
20600	FORESTRY	5,198	6,812	6,244	1,747	20,001
	<u>TOTALS</u>	<u>42,178</u>	<u>40,148</u>	<u>32,685</u>	<u>10,127</u>	<u>125,138</u>
3	<u>ASTRONOMY & ASTROPHYSICS</u>					
30100	ASTRONOMY	7,181	8,943	12,726	8,328	37,178
30200	ASTROPHYSICS	21,180	25,796	30,142	17,296	94,414
30300	CELESTIAL MECHANICS	5,228	6,045	5,751	2,438	19,462
	<u>TOTALS</u>	<u>33,589</u>	<u>40,784</u>	<u>48,619</u>	<u>28,062</u>	<u>151,054</u>
4	<u>ATMOSPHERIC SCIENCES</u>					
40100	ATMOSPHERIC PHYSICS	51,784	130,170	138,750	26,790	347,494
40200	METEOROLOGY	66,705	135,213	189,901	109,330	501,149
	<u>TOTALS</u>	<u>118,489</u>	<u>265,383</u>	<u>328,651</u>	<u>136,120</u>	<u>848,643</u>

DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>DATABASE RANGES</u>				<u>TOTALS</u>
5		<u>BEHAVIOR & SOCIAL SCIENCE</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	
	50100	ADMINISTRATION & MANAGEMENT	115,105	273,118	606,443	343,279	1,337,945
	50200	INFORMATION SCIENCE	137,443	172,616	282,658	202,031	794,748
	50300	ECONOMICS AND COST ANALYSIS	83,516	155,997	172,270	160,513	572,296
	50400	GOVERNMENT & POLITICAL SCIENCE	38,467	91,050	115,150	163,401	408,068
	50500	SOCIOLOGY & LAW	34,007	48,499	82,646	56,677	221,829
	50600	HUMANITIES AND HISTORY	95,264	247,524	337,110	86,663	766,561
	50700	LINGUISTICS	20,114	18,179	30,325	12,298	80,916
	50800	PSYCHOLOGY	98,159	168,153	208,862	103,428	578,602
	50900	PERSONNEL MANAGEMENT & LABOR RELATIONS	34,338	118,982	231,475	201,235	586,030
		<u>TOTALS</u>	<u>656,413</u>	<u>1,294,118</u>	<u>2,066,939</u>	<u>1,329,525</u>	<u>5,346,995</u>

6		<u>BIOLOGICAL & MEDICAL SCIENCES</u>					
	60100	BIOCHEMISTRY	16,584	27,642	59,586	67,409	171,221
	60200	GENETIC ENGINEERING & MOLECULAR BIOLOGY	9	15	10,632	9,775	20,431
	60300	BIOLOGY	13,593	14,997	33,102	39,747	101,439
	60400	ANATOMY & PHYSIOLOGY	50,428	70,849	92,838	86,711	300,826
	60500	MEDICINE & MEDICAL RESEARCH	39,691	78,527	156,255	189,705	464,178
	60600	ECOLOGY	662	1,612	3,600	16,558	22,432
	60700	RADIOBIOLOGY	13,262	36,070	43,205	17,787	110,324
	60800	FOOD, FOOD SERVICE & NUTRITION	4,247	11,389	13,689	9,585	38,910
	60900	HYGIENE & SANITATION	1,198	1,449	4,398	1,354	8,399
	61000	STRESS PHYSIOLOGY	19,070	47,404	73,664	32,349	172,487
	61100	TOXICOLOGY	7,386	33,370	68,927	40,063	149,746
	61200	MEDICAL FACILITIES, EQUIPMENT & SUPPLIES	8,377	24,697	20,012	23,357	76,443
	61300	MICROBIOLOGY	31,431	31,140	33,658	31,981	128,210
	61400	WEAPONS EFFECT(BIOLOGICAL)	7,210	11,238	14,387	5,229	38,064
	61500	PHARMACOLOGY	13,644	29,372	69,039	29,319	141,374
		<u>TOTALS</u>	<u>226,792</u>	<u>419,771</u>	<u>696,992</u>	<u>600,929</u>	<u>1,944,484</u>

DOCUMENTS ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
7		<u>CHEMISTRY</u>					
	70100	INDUSTRIAL CHEMISTRY & CHEMICAL PROCESSING	8,854	22,839	26,154	12,080	<u>69,927</u>
	70200	INORGANIC CHEMISTRY	21,050	48,059	78,462	208,744	<u>356,315</u>
	70300	ORGANIC CHEMISTRY	30,402	62,575	106,292	132,051	<u>331,320</u>
	70400	PHYSICAL CHEMISTRY	56,260	113,043	179,000	242,182	<u>590,485</u>
	70500	RADIATION & NUCLEAR CHEMISTRY	14,941	27,570	38,977	23,807	<u>105,295</u>
	70600	POLYMER CHEMISTRY	<u>18,542</u>	<u>47,315</u>	<u>86,779</u>	<u>91,445</u>	<u>244,081</u>
		<u>TOTALS</u>	<u>150,049</u>	<u>321,401</u>	<u>515,664</u>	<u>710,309</u>	<u>1,697,423</u>
8		<u>EARTH SCIENCES & OCEANOGRAPHY</u>					<u>TOTALS</u>
	80100	BIOLOGICAL OCEANOGRAPHY	16,268	26,110	35,957	9,134	<u>87,469</u>
	80200	CARTOGRAPHY & AERIAL PHOTOGRAPHY	38,295	61,180	60,524	24,791	<u>184,790</u>
	80300	PHYSICAL & DYNAMIC OCEANOGRAPHY	61,582	134,260	161,648	104,970	<u>462,460</u>
	80400	GEOMAGNETISM	11,110	21,811	23,886	4,705	<u>61,512</u>
	80500	GEODESY	14,992	31,940	47,700	12,836	<u>107,468</u>
	80600	GEOGRAPHY	5,617	19,221	15,335	41,524	<u>81,697</u>
	80700	GEOLOGY, GEOCHEMISTRY & MINERALOGY	25,537	53,608	53,405	28,423	<u>160,973</u>
	80800	HYDROLOGY, LIMNOLOGY & POTAMATOLOGY	11,849	32,146	97,589	42,564	<u>184,148</u>
	80900	MINING ENGINEERING	5,890	20,702	16,802	2,783	<u>46,177</u>
	81000	SOIL MECHANICS	16,855	40,888	39,403	24,697	<u>121,843</u>
	81100	SEISMOLOGY	23,469	42,376	47,886	20,944	<u>134,675</u>
	81200	SNOW, ICE & PERMAFROST	<u>9,468</u>	<u>26,264</u>	<u>33,245</u>	<u>19,480</u>	<u>88,457</u>
		<u>TOTALS</u>	<u>240,932</u>	<u>510,506</u>	<u>633,380</u>	<u>336,851</u>	<u>1,721,669</u>

DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
9		<u>ELECTROTECHNOLOGY & FLUIDICS</u>					
	90100	ELECTRICAL & ELECTRONIC EQUIPMENT	299,620	585,029	477,220	302,052	1,663,921
	90200	FLUIDICS & FLUERICS	7,858	13,578	4,522	1,757	27,715
	90300	LASERS & MASERS	84,384	346,726	280,493	131,033	842,636
	90400	LINE, SURFACE & BULK ACOUSTIC WAVE DEVICES	439	16,462	12,572	2,806	31,840
	90500	ELECTROOPTICAL & OPTOELECTRONIC DEVICES	24,445	50,513	36,593	64,988	176,539
	90600	ACOUSTOOPTIC & OPTOACOUSTIC DEVICES	7	1,929	5,910	8,623	16,469
	90700	ELECTROMAGNETIC SHIELDING	496	5,643	7,558	14,447	28,144
		<u>TOTALS</u>	<u>417,249</u>	<u>1,019,880</u>	<u>824,868</u>	<u>525,706</u>	<u>2,787,703</u>
10		<u>POWER PRODUCTION & ENERGY CONVERSION</u>					
	100100	NON-ELECTRIC ENERGY CONVERSION	8,630	11,633	10,879	4,322	35,464
	100200	ELECTRIC POWER PRODUCTION & DISTRIBUTION	37,389	62,512	69,703	25,898	195,502
	100300	ELECTROCHEMICAL ENERGY STORAGE	17,046	28,226	25,053	12,118	82,443
	100400	ENERGY STORAGE	568	3,800	4,919	2,234	11,521
		<u>TOTALS</u>	<u>63,633</u>	<u>106,171</u>	<u>110,554</u>	<u>44,572</u>	<u>324,930</u>

DOCUMENTS ORDERED BY FIELD & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
11	<u>MATERIALS</u>					
	110100 ADHESIVES, SEALS & BINDERS	8,912	23,472	21,790	16,036	70,210
	110200 CERAMICS, REFRACTORIES & GLASS	34,925	74,513	75,060	52,472	236,970
	110201 REFRACTORY FIBERS	6,100	10,607	7,606	5,823	30,136
	110300 COATINGS, COLORANTS & FINISHES	22,321	53,025	60,385	45,062	180,793
	110400 LAMINATES & COMPOSITE MATERIALS	57,199	149,135	206,630	176,493	589,457
	110500 TEXTILES	9,272	24,086	20,527	10,151	64,036
	110600 METALLURGY & METALLOGRAPHY	62,621	120,563	127,510	59,290	369,984
	110601 PROPERTIES OF METALS & ALLOYS	46,533	82,984	102,377	70,617	302,511
	110602 FABRICATION METALLURGY	51,266	81,049	77,364	26,062	235,741
	110700 MISCELLANEOUS MATERIALS	19,640	20,263	12,517	15,922	68,342
	110800 LUBRICANTS & HYDRAULIC FLUIDS	13,212	24,283	20,824	12,288	70,607
	110900 PLASTICS	37,743	71,427	107,380	47,183	263,733
	111000 ELASTOMERS	10,570	14,540	21,487	11,239	57,836
	111100 SOLVENTS, CLEANERS & ABRASIVES	1,093	2,044	2,332	4,463	9,932
	111200 WOOD, PAPER & RELATED FORESTRY PRODUCTS	2,836	5,917	7,098	2,448	18,299
	<u>TOTALS</u>	384,243	757,908	870,887	555,549	2,568,587
12	<u>MATHEMATICAL & COMPUTER SCIENCES</u>					
	120100 NUMERICAL MATHEMATICS	32,855	102,889	246,413	86,606	468,763
	120200 THEORETICAL MATHEMATICS	45,093	92,966	160,704	27,984	326,747
	120300 STATISTICS & PROBABILITY	65,966	160,598	286,650	77,241	590,455
	120400 OPERATIONS RESEARCH	96,585	96,250	74,901	66,847	334,583
	120500 COMPUTER PROGRAMMING & SOFTWARE	197,724	610,963	778,478	506,098	2,093,263
	120600 COMPUTER HARDWARE	178,115	393,437	405,724	80,435	1,057,711
	120700 COMPUTER SYSTEMS	41,868	67,963	122,715	142,451	374,997
	120800 COMPUTER SYSTEMS MANAGEMENT & STANDARDS	355	14,588	9,200	20,222	44,365
	120900 CYBERNETICS	47,828	115,601	131,538	133,240	428,207
	<u>TOTALS</u>	706,389	1,655,255	2,216,323	1,141,124	5,719,091

DOCUMENTS ORDERED BY FIELD & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
13	MECHANICAL, INDUSTRIAL, CIVIL & MAR E ENGINEERING					
130100	AIR CONDITIONING, HEATING, LIGHTING & VENTILATING	16,658	38,578	42,210	27,143	124,589
130200	CIVIL ENGINEERING	12,437	88,804	207,367	60,719	369,327
130300	CONSTRUCTION EQUIPMENT, MATERIALS & SUPPLIES	5,377	20,669	25,517	14,164	65,727
130400	CONTAINERS AND PACKAGING	10,928	25,506	14,304	25,543	76,281
130500	COUPLERS, FASTNERS & JOINTS	9,951	26,977	21,623	13,284	71,835
130600	SURFACE TRANSPORTATION & EQUIPMENT	21,432	51,374	61,643	35,793	170,242
130601	SURFACE EFFECT VEHICLES & AMPHIBIOUS VEHICLES	10,272	22,033	8,790	1,733	42,828
130700	HYDRAULIC & PNEUMATIC EQUIPMENT	10,249	20,504	17,405	12,633	60,791
130800	MANUFACTURING & INDUSTRIAL ENGINEERING & CONT	68,951	129,694	151,019	85,247	434,911
130900	MACHINERY & TOOLS	18,919	41,670	43,476	28,705	132,770
131000	MARINE ENGINEERING	67,238	171,067	153,607	96,175	488,087
131001	SUBMARINE ENGINEERING	22,942	50,608	50,235	34,917	158,702
131100	PUMPS, FILTERS, PIPES, TUBING, FITTINGS, & VALVES	15,915	17,899	16,740	10,283	60,837
131200	SAFETY ENGINEERING	18,072	47,471	53,289	35,221	154,053
131300	STRUCTURAL ENGINEERING & BUILDING TECHNOLOGY	47,641	72,310	78,672	36,541	235,164
	TOTALS	356,982	825,164	945,897	518,101	2,646,144

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTAL</u>
14	TEST EQUIPMENT, RESEARCH FACILITIES & REPROGRAPHY					
140100	HOLOGRAPHY	8,669	10,555	10,858	7,225	37,307
140200	TEST FACILITIES, EQUIPMENT & METHODS	111,975	287,138	391,898	125,468	916,479
140300	RECORDING & PLAYBACK DEVICES	6,831	12,709	12,579	14,055	46,174
140400	PHOTOGRAPHY	25,590	29,767	17,767	15,627	88,751
140500	PRINTING & GRAPHIC ARTS	4,745	9,121	15,349	6,607	35,822
	TOTALS	157,810	349,290	448,451	168,982	1,124,533

DOCUMENT ORDERS BY FIELDS & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>15</u>	<u>MILITARY SCIENCES</u>					
150100	MILITARY FORCES & ORGANIZATIONS	683	6,354	39,402	222,145	268,584
150200	CIVIL DEFENSE	11,456	16,519	10,659	3,967	42,601
150300	DEFENSE SYSTEMS	23,220	83,741	63,919	74,692	245,572
150301	ANTIMISSILE DEFENSE SYSTEMS	46,213	187,271	120,334	50,325	404,143
150302	ANTIAIRCRAFT DEFENSE SYSTEMS	30,366	94,352	35,132	11,858	171,708
150303	ANTISATELLITE DEFENSE SYSTEMS	2,666	13,717	11,695	2,502	30,580
150400	MILITARY INTELLIGENCE	56,137	156,488	81,365	59,152	353,142
150500	LOGISTICS, MILITARY FACILITIES & SUPPLIES	71,751	202,840	333,948	283,203	891,742
150600	MILITARY OPERATIONS, STRATEGY & TACTICS	197,793	413,640	498,929	337,903	1,448,265
150601	NAVAL SURFACE WARFARE	17,925	57,744	56,262	25,930	157,861
150602	UNDERSEA & ANTISUBMARINE WARFARE	35,455	144,713	64,997	32,066	277,231
150603	CHEMICAL, BIOLOGICAL & RADIOLOGICAL WARF	79,107	103,102	199,395	108,892	490,496
150604	NUCLEAR WARFARE	32,302	61,067	63,082	21,140	177,591
150605	SPACE WARFARE	1,377	3,831	6,777	5,329	17,314
150606	LAND MINE WARFARE	1,644	4,591	10,359	17,464	34,058
150607	UNCONVENTIONAL WARFARE	74,007	56,642	32,097	25,351	188,097
	<u>TOTALS</u>	<u>682,102</u>	<u>1,606,612</u>	<u>1,628,352</u>	<u>1,281,919</u>	<u>5,198,985</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>16</u>	<u>GUIDED MISSILE TECHNOLOGY</u>					
160100	GUIDED MISSILE LAUNCHING & BASING SUPPORT	39,346	33,655	52,032	15,345	140,378
160200	GUIDED MISSILE TRAJECTORIES, ACCURACY & B	19,649	27,237	21,619	10,664	79,169
160201	GUIDED MISSILE DYNAMICS, CONFIGURATIONS	12,861	21,347	14,036	6,393	54,637
160300	GUIDED MISSILE WARHEADS AND FUZES	26,056	35,027	22,973	6,745	90,801
160400	GUIDED MISSILES	78,493	81,895	88,105	34,077	282,570
160401	AIR & SPACE-LAUNCHED GUIDED MISSILES	42,240	129,470	91,137	29,157	292,004
160402	SURFACE-LAUNCHED GUIDED MISSILES	99,488	178,513	100,057	27,743	405,801
160403	UNDERWATER-LAUNCHED GUIDED MISSILES	7,220	20,774	6,668	2,112	36,774
160500	GUIDED MISSILE REENTRY VEHICLES	25,804	85,327	37,989	6,886	156,006
	<u>TOTAL</u>	<u>351,157</u>	<u>613,245</u>	<u>396,627</u>	<u>139,122</u>	<u>1,500,151</u>

DOCUMENTS ORDERED BY FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
17		<u>NAVIGATION, DETECTION & COUNTERMEASURES</u>					
	170100	ACOUSTIC DETECTION & DETECTORS	82,219	249,088	132,984	80,323	544,614
	170200	NON-ACOUSTIC & NON-MAGNETIC SUBMARINE D	19	480	2,171	1,363	4,033
	170300	DIRECTION FINDING	10,478	34,321	21,537	3,795	70,131
	170400	COUNTERMEASURES	34,359	130,339	141,094	46,104	351,896
	170401	RADIO COUNTERMEASURES	12,706	38,373	21,001	9,470	81,550
	170402	ACOUSTIC COUNTERMEASURES	1,058	9,067	2,676	2,541	15,342
	170403	RADAR COUNTERMEASURES	66,109	125,043	43,210	20,138	254,500
	170404	OPTICAL COUNTERMEASURES	6,451	61,855	36,144	20,086	124,536
	170500	OPTICAL DETECTION & DETECTORS	69,831	194,069	101,730	66,181	431,811
	170501	INFRARED DETECTION & DETECTORS	77,837	290,851	191,302	80,289	640,279
	170502	ULTRAVIOLET DETECTION & DETECTORS	9,794	12,062	7,226	3,480	32,562
	170600	MAGNETIC & ELECTRIC FIELD DETECTION & DETE	8,058	20,992	15,591	7,332	51,973
	170700	NAVIGATION & GUIDANCE	8,718	33,028	31,665	38,593	112,004
	170701	LAND & RIVERINE NAVIGATION & GUIDANCE	2,436	4,651	4,038	5,883	17,008
	170702	UNDERWATER & MARINE NAVIGATION & GUIDAN	2,026	7,119	6,707	13,904	29,756
	170703	AIR NAVIGATION & GUIDANCE	51,675	117,600	83,695	38,757	291,727
	170704	SPACE NAVIGATION & GUIDANCE	10,006	7,020	6,038	4,594	27,658
	170800	MISCELLANEOUS DETECTION & DETECTORS	197	549	5,744	14,930	21,420
	170900	ACTIVE & PASSIVE RADAR DETECTION & EQUIPM	249,458	523,871	361,942	153,095	1,288,366
	171000	SEISMIC DETECTION & DETECTORS	11,540	30,705	13,592	10,399	66,236
	171100	TARGET DIRECTION, RANGE & POSITION FINDING	2,011	6,111	24,028	39,876	72,026
		<u>TOTALS</u>	<u>716,986</u>	<u>1,897,194</u>	<u>1,254,115</u>	<u>661,133</u>	<u>4,529,428</u>

DOCUMENT ORDERS BY FIELD AND GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
18		NUCLEAR SCIENCE AND TECHNOLOGY					
	180100	FUSION DEVICES (THERMONUCLEAR)	867	3,931	8,722	4,861	18,381
	180200	ISOTOPES	273	516	488	6,341	7,618
	180300	NUCLEAR EXPLOSI N & DEVICES(NONMILITARY)	2,425	10,802	4,854	2,875	20,956
	180400	NUCLEAR INSTRUMENTATION	8,298	10,711	8,741	10,226	37,976
	180500	NUCLEAR POWER PLANTS & FUSION REACTOR EN	4,031	3,522	7,082	3,973	18,608
	180501	NUCLEAR FISSION REACTORS(POWER)	440	838	2,348	1,663	5,289
	180502	NUCLEAR FISSION REACTOR(NON-POWER)	619	1,386	1,112	291	3,408
	180600	NUCLEAR RADIATION SHIELDING,PROTECTION & S	7,466	48,059	33,952	8,162	97,639
	180700	RADIOACTIVITY, RADIOACTIVE WASTES & FISSION	31,008	56,407	22,122	9,135	118,672
	180800	SNAP(SYSTEMS FOR NUCLEAR AUXILIARY POWER)	1,330	1,042	376	531	3,279
	180900	FISSION REACTOR PHYSICS	899	1,184	1,375	1,429	4,887
	181000	FISSION REACTOR MATERIALS	1,830	2,493	2,012	1,373	7,708
		TOTALS	59,486	140,891	93,184	50,860	344,421

DOCUMENT ORDERS BY FIELDS & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>ORDNANCE</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
19								
190100		AMMUNITION & EXPLOSIVES		137,577	312,343	282,627	130,074	862,621
190101		PYROTECHNICS		17,261	34,854	33,987	17,574	103,676
190200		AERIAL BOMBS		22,941	57,570	26,178	16,686	123,375
190300		COMBAT VEHICLES		24,515	82,920	130,938	40,181	278,554
190400		ARMOR		23,132	44,627	50,933	15,196	133,888
190500		FIRE CONTROL & BOMBING SYSTEMS		44,376	166,850	89,725	48,107	349,058
190600		GUNS		34,164	91,489	92,065	56,671	274,389
190700		ROCKETS		28,951	42,614	21,945	12,662	106,172
190800		UNDERWATER ORDNANCE		8,897	19,472	11,471	5,702	45,542
190801		TORPEDOES		12,064	34,631	25,527	7,191	79,413
190900		EXPLOSIONS		40,219	70,146	59,486	29,843	199,694
191000		BALLISTICS		40,607	101,798	55,641	28,958	227,004
191100		NUCLEAR WEAPONS		48,649	80,085	64,822	45,464	239,020
191200		DIRECTED ENERGY WEAPONS		336	13,836	16,123	12,355	42,650
191300		GUIDED MUNITIONS		717	3,010	3,793	7,820	15,340
		<u>TOTALS</u>		<u>484,406</u>	<u>1,156,245</u>	<u>965,261</u>	<u>474,484</u>	<u>3,080,396</u>

DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
20		<u>PHYSICS</u>					
200100		ACOUSTICS	65,328	167,175	149,586	95,384	477,473
200200		CRYSTALLOGRAPHY	28,531	49,154	67,619	71,643	216,947
200300		ELECTRICITY & MAGNETISM	40,417	85,216	149,056	145,710	420,399
200400		FLUID MECHANICS	148,858	257,541	301,189	174,532	882,120
200500		ATOMIC & MOLECULAR PHYSICS & SPECTROSCOPY	45,700	94,908	189,179	127,438	457,225
200600		OPTICS	73,707	171,716	226,272	191,180	662,875
200601		FIBER OPTICS & INTEGRATED OPTICS	3,833	22,045	39,290	30,969	96,137
200700		PARTICLE ACCELERATORS	3,516	11,012	39,394	19,927	73,849
200800		NUCLEAR PHYSICS & ELEMENTARY PARTICLE PHYS	36,285	49,718	52,826	36,769	175,598
200900		PLASMA PHYSICS & MAGNETOHYDRODYNAMICS	30,826	63,361	74,767	34,816	203,770
201000		QUANTUM THEORY & RELATIVITY	9,803	17,447	26,433	26,753	80,436
201100		MECHANICS	114,173	166,615	242,948	131,399	655,135
201200		SOLID STATE PHYSICS	65,062	164,425	171,337	69,498	470,322
201300		THERMODYNAMICS	40,896	49,498	65,850	96,749	252,993
201400		RADIOFREQUENCY WAVE PROPAGATION	55,523	128,437	174,686	80,219	438,865
201500		ELECTROMAGNETIC PULSES	2,998	24,771	36,197	10,872	74,838
		<u>TOTALS</u>	<u>765,456</u>	<u>1,523,039</u>	<u>2,006,629</u>	<u>1,343,858</u>	<u>5,638,982</u>

DOCUMENT ORDERS BY FIELD & GROUPS

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
21		<u>PROPULSION, ENGINES & FUELS</u>					
	210100	AIR BREATHING ENGINES (UN ONVENTI NAL)	3,669	2,408	6,615	3,598	16,290
	210200	COMBUSTION & IGNITION	30,551	59,314	82,671	47,522	220,058
	210300	ELECTRIC & ION PROPULSION	4,249	5,510	7,451	5,895	23,105
	210400	FUELS	13,400	35,124	52,146	28,864	129,534
	210500	JET & GAS TURBINE ENGINES	48,978	121,703	114,101	56,073	340,855
	210600	NUCLEAR PROPULSION	3,740	2,397	3,049	1,756	10,942
	210700	RECIPROCATING & ROTATING ENGINES	4,735	11,281	14,571	7,006	37,593
	210800	ROCKET ENGINES	29,553	27,588	28,151	15,550	100,842
	210801	LIQUID PROPELLANT ROCKET ENGINES	22,447	15,981	9,532	4,661	52,621
	210802	SOLID PROPELLANT ROCKET ENGINES	33,750	49,229	38,038	13,018	134,035
	210900	ROCKET PROPELLANTS	9,192	6,767	8,778	8,740	33,477
	210901	LIQUID ROCKET PROPELLANTS	26,926	15,353	10,063	5,445	57,787
	210902	SOLID ROCKET PROPELLANTS	42,389	48,406	34,119	11,667	136,581
		<u>TOTAL</u>	<u>273,579</u>	<u>401,061</u>	<u>409,285</u>	<u>209,795</u>	<u>1,293,720</u>

<u>FIELD</u>	<u>GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
22		<u>SPACE TECHNOLOGY</u>					
	220100	ASTRONAUTICS	11,974	10,287	37,702	28,339	88,302
	220200	UNMANNED SPACECRAFT	80,183	125,483	141,089	52,870	399,625
	220300	SPACECRAFT TRAJECTORIES & REENTRY	21,987	18,742	19,857	10,335	70,921
	220400	GROUND SUPPORT SYSTEMS & FACILITIES F	25,405	7,608	6,244	4,659	43,916
	220500	MANNED SPACECRAFT	18,136	10,393	10,120	18,823	57,472
		<u>TOTAL</u>	<u>157,685</u>	<u>172,513</u>	<u>215,012</u>	<u>115,026</u>	<u>660,236</u>

DOUCMENT ORDERS BY FIELD & GROUPS

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>23</u>	<u>BIOTECHNOLOGY</u>					
230100	BIOMEDICAL INSTRUMENTATION & BIOENGINEERIN	2,870	7,356	5,491	3,072	18,789
230200	HUMAN FACTORS ENGINEERING & MAN MACHINE S	46,180	91,058	162,392	56,840	356,470
230300	BIONICS	27,726	28,256	43,013	7,512	106,507
230400	PROTECTIVE EQUIPMENT	11,853	26,176	39,275	33,801	111,105
230500	LIFE SUPPORT SYSTEMS	9,981	11,936	14,474	8,844	45,235
230600	ESCAPE, RESCUE & SURVIVAL	4,277	17,004	17,351	12,185	50,817
	<u>TOTALS</u>	<u>102,887</u>	<u>181,786</u>	<u>281,996</u>	<u>122,254</u>	<u>688,923</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>24</u>	<u>ENVIRONMENTAL POLLUTION & CONTROL</u>					
240100	AIR POLLUTION & CONTROL	3,221	24,759	16,424	18,479	62,883
240200	NOISE POLLUTION & CONTROL	-	926	1,596	7,884	10,406
240300	SOLID WASTES POLLUTION & CONTROL	-	28	6,987	47,595	54,610
240400	WATER POLLUTION & CONTROL	2,643	43,024	39,488	61,446	146,601
240500	PESTICIDES POLLUTION & CONTROL	66	874	1,259	4,666	6,865
240600	RADIATION POLLUTION & CONTROL	220	281	3,656	6,257	10,414
240700	ENVIRONMENTAL HEALTH & SAFETY	1,612	7,617	13,338	43,863	66,430
	<u>TOTALS</u>	<u>7,762</u>	<u>77,509</u>	<u>82,748</u>	<u>190,190</u>	<u>358,209</u>

<u>FIELD GROUP</u>	<u>NAME</u>	<u>1960-1970</u>	<u>1970-1980</u>	<u>1980-1990</u>	<u>1990-1997</u>	<u>TOTALS</u>
<u>25</u>	<u>COMMUNICATIONS</u>					
250100	TELEMETRY	13,493	13,887	11,717	13,724	52,821
250200	RADIO COMMUNICATIONS	98,799	173,511	160,147	98,720	531,177
250300	NON-RADIO COMMUNICATIONS	55,278	206,859	26,277	20,085	308,499
250400	VOICE COMMUNICATIONS	14,328	46,537	42,924	16,444	120,233
250500	COMMAND, CONTROL & COMMUNICATIONS SYSTEM	15,897	95,099	193,627	115,190	419,813
	<u>TOTALS</u>	<u>197,795</u>	<u>535,893</u>	<u>434,692</u>	<u>264,163</u>	<u>1,432,543</u>

APPENDIX 4

NEW FIELD AND GROUP CHART FIELD & GROUP MAPPING CHART

Proposed Changes to Subject Categories (Adkins)

01/00/00 Aviation Technology

01/01 Aerodynamics
 01/02 Military Aircraft Operations
 01/03 Aircraft
 01/03/01 Helicopters
 01/03/02 Bombers
 01/03/03 Attack and Fighter Aircraft
 01/03/04 Patrol & Reconnaissance Aircraft
 01/03/05 Transport Aircraft
 01/03/06 Training Aircraft
 01/03/07 V/STOL
 01/03/08 Gliders and Parachutes
 01/03/09 Civilian Aircraft
 01/03/10 Pilotless Aircraft
 01/03/11 Lighter-than-Air Aircraft
 01/03/12 Research and Experimental Aircraft
 01/04 Flight Control and Instrumentation
 01/05 Terminal Flight Facilities
 01/06 Commercial and General Aviation

03a/00 Space Technology and Astronomy

22/00 Space Technology
 22/01 Astronautics
 22/02 Unmanned Spacecraft
 22/03 Spacecraft Trajectories and Reentry
 22/04 Ground Support Systems and Facilities for Space Vehicles
 22/05 Manned Spacecraft

 03/01 Astronomy
 03/03 Celestial Mechanics

04a Atmospheric and Ocean Sciences

04/00 Atmospheric Sciences
 04/01 Atmospheric Physics
 04/02 Meteorology

Oceanology
 08/01 Biological Oceanography
 08/03 Physical and Dynamic Oceanography

Management Sciences and Technology

Management Sciences
 05/01 Administration and Management
 05/03 Economics and Cost Analysis
 05/09 Personnel Management and Labor Relations

02a Earth Sciences

02/ Agriculture
 02/01 Agricultural Chemistry
 02/02 Agricultural Economics
 02/03 Agricultural Engineering
 02/04 Agronomy, Horticulture and Aquiculture
 02/05 Animal Husbandry and Veterinary Medicine
 02/06 Forestry

 08/04 Geomagnetism
 08/05 Geodesy
 08/06 Geography
 08/07 Geology Geochemistry and Mineralogy
 08/08 Hydrology, Limnology and Potamology
 08/09 Mining Engineering
 08/10 Soil Mechanics
 08/11 Seismology
 08/12 Snow, Ice and Permafrost

Life Sciences

23/01 Biomedical Instrumentation and Bioengineering
 23/02 Human Factor Engineering and Man Machine Systems
 23/03 Bionics
 Biotechnology
 23/04 Protective Equipment
 23/05 Life Support Systems
 23/06 Bioscience
 06/01 Biochemistry
 06/02 Genetic Engineering and Molecular Biology
 06/03 Biology
 06/06 Ecology
 06/07 Radiobiology
 06/08 Food, Food Service and Nutrition

05b Social Sciences and Psychology

05/04 Government and Political Science
 05/05 Sociology and Law
 05/06 Humanities and History
 05/07 Behavior Sciences
 05/08 Psychology

06a Medical and Pharmaceutical Sciences

06/05 Medicine and Medical Research
 06/09 Hygiene and Sanitation
 06/10 Stress Physiology
 06/11 Toxicology
 06/12 Medical Facilities, Equipment and Supplies
 06/13 Microbiology
 06/14 Weapons Effects (Biological)
 06/15 Pharmacology
 Anatomy and Physiology

07 Chemistry

- 07/0 Industrial Chemistry and Chemical Processing
- 07/02 Inorganic Chemistry
- 07/03 Organic Chemistry
- 07/04 Physical Chemistry
- 07/05 Radiation and Nuclear Chemistry
- 07/06 Polymer Chemistry

11 Materials Sciences and Technology

- 11/01 Adhesives, Seals and Binders
- 11/02 Ceramics, Refractories and Glass
- 11/02/01 Refractory Fibers
- 11/03 Coatings, Colorants and Finishes
- 11/04 Laminates and Composite Materials
- 11/05 Textiles
- 11/06 Metallurgy and Metallography
- 11/06/01 Properties of Metals and Alloys
- 11/06/02 Fabrication Metallurgy
- 11/07 Miscellaneous Materials
- 11/08 Lubricants and Hydraulic Fluids
- 11/09 Plastics
- 11/10 Elastomers and Rubber
- 11/11 Solvents, Cleaners and Abrasives
- 11/12 Wood, Paper and Related Forestry Products

10 Power Production and Energy Conversion (Nonpropulsive)

- 10/01 Non-electrical Energy Conversion
- 10/02 Electric Power Production and Distribution
- 10/03 Electrochemical Energy Storage
- 10/04 Energy Storage

12a Mathematical Sciences and Modeling Technology

- 12/01 Numerical Mathematics
- 12/02 Theoretical Mathematics
- 12/03 Statistics and Probability
- 12/04 Operations Research Models
Mathematical Models

12b Computers and Information Systems

- 05/01 Information Systems Technology
- 05/02 Information Sciences
Information Systems
- 05/07 Linguistics
- 12/05 Computer Programming and Software
- 12/06 Computer Hardware
- 12/07 Computer Systems/Computer Networking Technology
- 12/08 Computer Systems Management and Standards
- 12/09 Cybernetics
- 12/10 Decision Support System Technology
- 12/11 Knowledge Base and Expert Systems

13 Mechanical, Industrial, Civil and Marine Engineering

- 13/01 Systems and Subsystems Engineering
- 13/02 Civil Engineering
- 13/08 Manufacturing and Industrial Engineering and Control of Production Systems
- 13/10 Marine Engineering
- 13/10/01 Submarine Engineering
- 13/12 Safety Engineering
- 13/13 Structural Engineering and Building Technology

13a Machinery, Tooling, and Packaging Technology

- 13/01 Air Conditioning, Heating, Lighting and Ventilating
- 13/03 Construction Equipment, Materials and Supplies
- 13/04 Containers and Packaging
- 13/05 Couplers, Fasteners and Joints
- 13/06 Surface Transportation and Equipment
- 13/07 Hydraulic and Pneumatic Equipment
- 13/09 Machinery and Tools
- 13/10 Metal Working and Machining Technology
- 13/11 Pumps, Filters, Pipes, Tubing, Fittings and Valves

14 Test Equipment, Research Facilities and Reprography

- 14/01 Holography
- 14/02 Test Facilities, Equipment and Methods
- 14/03 Recording and Playback Devices
- 14/04 Photography
- 14/05 Printing and Graphic Arts
- 08/02 Cartography and Aerial Photography

15 Military Sciences

- 15/01 Military Forces and Organizations
- 15/02 Civil Defense
- 15/03 Defense Systems
 - 15/03/01 Antimissile Defense Systems
 - 15/03/02 Antiaircraft Defense Systems
 - 15/03/03 Antisatellite Defense Systems
- 15/04 Military Intelligence
- 15/05 Logistics, Military Facilities and Supplies
- 15/06 Military Operations Strategy and Tactics
 - 15/06/01 Naval Surface Warfare
 - 15/06/02 Undersea and Antisubmarine Warfare
 - 15/06/03 Chemical, Biological and Radiological Warfare
 - 15/06/04 Nuclear Warfare
 - 15/06/05 Space Warfare
 - 15/06/06 Land Mine Warfare
 - 15/06/07 Unconventional Warfare

17 Detection and Countermeasures

- 17/01 Acoustic Detection and Detectors
- 17/02 Non-acoustic and Non-magnetic Submarine Detection
- 17/03 Direction Finding
- 17/04 Countermeasures
 - 17/04/01 Radio Countermeasures
 - 17/04/02 Acoustic Countermeasures
 - 17/04/03 Radar Countermeasures
 - 17/04/04 Optical Countermeasures
- 17/05 Optical Detection and Detectors
 - 17/05/01 Infrared Detection and Detectors
 - 17/05/02 Ultraviolet Detection and Detectors
- 17/06 Magnetic and Electric Field Detection and Detectors

17a Navigation, Guidance and Vehicles Control Technology

- 17/07 Navigation and Guidance
 - 17/07/01 Land and Riverine Navigation and Guidance
 - 17/07/02 Underwater and Marine Navigation and Guidance
 - 17/07/03 Air Navigation and Guidance
 - 17/07/04 Space Navigation and Guidance
- 17/08 Miscellaneous Detection and Detectors
- 17/09 Active and Passive Radar Detection and Equipment
- 17/10 Seismic Detection and Detectors
- 17/11 Target Direction, Range and Position Finding

16. Guided Missile Technology

- 16/01 Guided Missile Launching and Basing Support
- 16/02 Guided Missile Trajectories, Accuracy and Ballistics
 - 16/02/01 Guided Missile Dynamics, Configurations and Control Surfaces
- 16/03 Guided Missile Warheads and Fuses
- 16/04 Guided Missiles
 - 16/04/01 Air-and-Space-Launched Guided Missiles
 - 16/04/02 Surface-Launched Guided Missiles
 - 16/04/03 Underwater-Launched Guided Missiles
- 16/05 Guided Missile Reentry Vehicles

17b Electronics and Optical (Technology)

- 09/01 Electrical and Electronic Equipment
 - Electrical Component Technology
- 09/03 Lasers and Masers
- 09/04 Line, Surface and Bulk Acoustic Wave Devices
- 09/05 Electrooptical and Optoelectronic Devices
- 09/06 Acoustooptic and Optoacoustic
- 09/07 Electromagnetic Shielding
- 20/06 Optics
 - 20/06/01 Fiber Optics and Integrated Optics
- 20/12 Solid State Physics
 - Semiconductor Technology
 - Magnetic and Optical Storage Technology

18 Nuclear Science and Technology

- 18/01 Fusion Devices (Thermonuclear)
- 18/02 Isotopes
- 18/03 Nuclear Explosions and Devices (Non-Military)
- 18/04 Nuclear Instrumentation
- 18/05 Nuclear Power Plants and Fission Reactor Engineering
 - 18/05/01 Nuclear Fission Reactors (Power)
 - 18/05/02 Nuclear Fission Reactors (Non-Power)
- 18/06 Nuclear Radiation Shielding, Protection and Safety
- 18/07 Radioactivity, Radioactive Wastes and Fission Products
- 18/08 SNAP (Systems for Nuclear Auxiliary Power) Technology
- 18/09 Fission Reactor Physics
- 18/10 Fission Reactor Materials
- 18/11 Fission Material Enrichment Technology

19 Ordnance

- | | |
|--|-------------------------------|
| 19/01 Ammunition <ul style="list-style-type: none">19/01/01 Pyrotechnics | 19/09 Explosions |
| 19/02 Aerial Bombs | 19/10 Ballistics |
| 19/03 Combat Vehicles | 19/11 Nuclear Weapons |
| 19/04 Armor | 19/12 Directed Energy Weapons |
| 19/05 Fire Control and Bombing Systems | 19/13 Guided Munitions |
| 19/06 Guns | |
| 19/07 Rockets | |
| 19/08 Underwater Ordnance | |
| 19/08/01 Torpedoes | |

20a Physics and Astrophysics

20/01 Acoustics
20/02 Crystallography
20/03 Electricity and Magnetism
20/04 Fluid Mechanics
20/05 Atomic and Molecular Physics and Spectroscopy
20/07 Particle Accelerators
20/08 Nuclear Physics and Elementary Particle Physics
20/09 Plasma Physics and magnetohydrodynamics
20/10 Quantum Theory and Relativity
20/11 Mechanics
20/13 Thermodynamics
20/14 Radiofrequency Wave Propagation
20/15 Electromagnetic Pulses
03/02 Astrophysics
09/02 Fluidics and Fluorics

21 Propulsion, Engines and Fuels Technology

21/01 Air Breathing Engines (Unconventional)
21/02 Combustion and Ignition
21/03 Electric and Ion Propulsion
21/04 Fuels
21/05 Jet and Gas Turbine Engines
21/06 Nuclear Propulsion
21/07 Reciprocating and Rotating Engines
21/08 Rocket Engines
21/08/01 Liquid Propellant Rocket Engines
21/08/02 Solid Propellant Rocket Engines
21/09 Rocket Propellants
21/09/01 Liquid Rocket Propellants
21/09/02 Solid Rocket Propellants

24 Environmental Pollution and Control

24/01 Air Pollution and Control
24/02 Noise Pollution and Control
24/03 Solid Wastes and Pollution and Control
24/04 Water Pollution and Control
24/05 Pesticides Pollution and Control
24/06 Radiation Pollution and Control
24/07 Environmental Health and Safety

25 Communications Technology

25/01 Telemetry
25/02 Radio Communications
25/03 Non-Radio Communications
25/04 Voice Communications
25/05 Command, Control and Communications Systems

APPENDIX 5

NEW INDEX TERMINOLOGY SUPPORTING FIELD CHANGES

APPENDIX 5

New Indexing Terminology Supporting Field Changes

Defense Acquisition System

Defense Contract Administration

Defense Regulations and Guidance

Defense Resources

Defense Information

Defense Mission

Cost Estimates

Cost Growth

Cost Objectives

Cost overruns

Cost Pricing Data

Cost Savings

Acquisition Life Cycle

Acquisition Planning

Acquisition Program

Acquisition Risk

Acquisition Strategy

Advanced Funding

Advanced Development

Advanced Technology Transition

Allocated Budgets

Allotment

Antideficiency Act

Appeal Process

Apportionment

Authorization

Balanced line

Baseline

Baseline Comparison System

Baseline Cost Estimates

Basic Ordering Agreement

Basic Research

Brassboard Configurations

Breadboard Configurations

Base Year

Break Even Point

Budget Estimates

Budgeted Costs

Budget Resolution

Business and Financial Management
Buyouts
Capacity Analysis
Combat Development
Combat System Test Installation
Comparability Analysis
competitive Prototyping Strategy
Commercial Components Products
Commonality
Competitive proposals
Concept Exploration
Concept Demonstration
Concurrency
Configuration Management
Budget Constraints
Contract Constraints
Contingency Testing
Contract Administration
Contract Authority
Contract Awards
Contract Cost Overruns
Contract Requirements
Contractor Acquired Property
Contractor Furnished Equipment
Contractor Performance Evaluations
Cost Based Budget
Cost Breakdown Structure
Cost Performance
Defense Technology Needs Assessment
Technology Demonstrations
Technology Management
Design To Unit Cost
Developing Activity
Disbursements
DoD Directives
DoD Instructions
Dual Source
Economic Ordering Quantity
Economic Engineering Analysis
Economic Production Rate
Economies of Scale
Engineering Change Proposals
Evaluation Criteria
Defense expenditures
Exploratory Development
Cost Extrapolation
Fatigue Allowance
Federal Acquisition Regulation

Figure of Merit
Fiscal Guidance
Fixed Costs
Flyaway Costs
Force Levels
Formal Qualification Review
Full Scale Development
Functional Analysis
Functional Baseline
Functional Configuration Identification
Functional Support
Functional Management
Gnatt Charts
Government Acquisition Quality Assurance
Government Furnished Equipment
Government Furnished Material
Government Furnished Property
Government Owned Contractor Operated
High Priority Programs
Host Nation Support
Incremental Funding
Indefinite Quantity Contracts
Independent Cost Analysis
Indirect Costs
Individual Acceptance Tests.
Industrial Base
Industrial Funds
Industrial Preparedness
Industrial Resources Analysis
Defense Infrastructure
Information Warfare
In process Inventory Control
Integrated Diagnostics
Integrated Logistics Support Management
Integrated Logistics Support Plan
Interchangeability
Intermediate Level Maintenance
Internal Control
Inventory Objectives
Invitation for Bid
Joint Acquisition Programs
Joint Services Operational Requirements
Just In Time Inventory
Labor Standards
Lapsed Funds
Learning Curve
Life Cycle Model
Life Cycle Management

Limited Production
Live Fire Tests
Logistic Support Analysis
Long Lead Items
Maintenance Planning
Manufacturing Technology
Manufacturing Engineering
Market Surveys
Material Management
Market Research
Military Critical Technology
Foreign Technology Assessments
Mean Time Between Failures
Measures Of Effectiveness
Methods Engineering
Metrology
Micromanagement
Midyear Reviews
Mission Analysis
Mission Areas
Mission Area Analysis
Mission Critical Assessments
Mission Elements
Mission Needs Analysis
Off the Shelf Items
Operating Budgets
Operations Process Charts
Operational Suitability
Organizational Level Maintenance
oversight
Parameter Cost Estimates
Pert Charts
Defense Acquisition Planning
Planning Programming and Budgeting
Post Production Support
Preliminary Design Reviews
Preventive Maintenance
Prime Contractor
Procurement Plan
Producibility Engineering
Product Configuration Identification
Product Improvement
Product Baseline
Production Engineering
Production Management
Production Readiness
Production Schedules
Productivity Enhancement

Excess Profits
Program Acquisition Costs
Program Management
Program Management Planning
Program Objectives Memorandum
Project Definitions
Proprietary Rights
Rating Factors
Reimbursable Costs
Required Operational Capability
Research and Development Costs
Resource Allocation Process
Risk Analysis
Risk Assessment
Risk Management
Small and Disadvantaged Businesses
Source Selection Plan
SWOT Analysis
Situational Analysis
Statement of Need
Statement Of Work
Statistical Process Control
Sunk Costs
Supplemental Agreements
Supplemental Appropriations
Surge Production
System Acquisition Process
System Design Concepts
System Design Reviews
Systems Engineering
Systems Effectiveness
System Operational Concepts
Technical Data Package
Technical Information Management
Technology Assessment
Technology Base
Technology Modernization
Time Phased Action Planning
Total Quality Management
Turn Around Time
Unit cost Curves
Unscheduled Maintenance
User Friendly Products
Variable Cost Estimates
Warfighting Needs
Warfighting Capability
Wholesale Price Index
Work Package Scheduling

Worst Case Scenario

New Candidate Sub-Language Posting Terms

three dimensional modeling
antitrust regulations
agribusiness
Agency for International Development
advanced wireless communications
advanced metals technology
advanced composite technology
administrative law
administrative management
analog integrated circuits
anti-infectious disease agents
auditory navigation
autofocusing techniques
battle damage prediction
bioelectronic sensors
biological particle detection
biomedical engineering
burst point control
Bankruptcy rules
bankruptcy courts
backpacks
business mergers
business acquisitions
business takeovers
apparel industry
cash management
ceramic matrix composites
chemical and biological decontamination
cloning
coherent processors
compression ignition engines
computational chemistry
computer graphics
computer system testing
constructive simulations
context sensitive reasoning
conventional weapons effects
cost engineering
cost control
cosmetics industry
copyright laws

corporate annual reports
corporate cash flows
consumer electronics
computer banking
computer aided engineering
computer industry
computer design
computer graphics
computer workshops
commercial lending
commercial law
cryptanalytic technologies
Consumer Product Safety Commission
damage tolerance
desynchronosis
drug testing
drug discovery
dry-mounted electrodes
electromyography
electronic digital compasses
electrorheology
embedded signal processing
energy density
environmental contamination
environmental remediation
environmental monitoring
environmental contamination
fault imaging
ferroelectric liquid crystals
financial accounting standards
financial accountability
financial institutions
financial management
financial regulations
Federal Acquisition Regulations
environmental law
employee benefit Plan
engineering management
electronic media
electronic learning
electronic design
electric utility industry
economic indicators
economic development
economic modeling
economic policy
economic risk
east European markets

digital video disks
drug evaluations
drug consultation
drug enforcement administration
drug detection
drug resistance
drug information network
distributed system management
direct marketing
discount merchandise
disclosure analysis
antitrust guidelines
defense technology business
Federal Regulation Codes
Federal Trade commission
Federal Rules of procedure
Federal Reserve Regulations
Federal Reserve Rules
Federal Procurement Regulations
Federal Reserve Banks
Federal Register
Federal Sentencing Guidelines
economic engineering analysis
entry vocabulary
European Communities
Europe environment
Environmental Compliance
environmental remediation
environmental statutes
environmental science and technology
engineering construction
Federal Trade Regulations
Federal Reserve policy
finned-grained manocrystalline materials
force ratio modeling
foreign technology assessment
foil bearings
fragment impact
freeze drying
gallium arsenide integrated circuits
gigahertz sample rate
graphic visualization
gray scale masking
handheld devices
high definition television
high level architecture
high temperature tribology
high impedance electrodes

hearing protection
high level computer architecture
high electron mobility transistors
hetro junction bipolar transistors
Honoraria contributions
horticulture
hospital administration
human dynamics modeling
hybrid electric vehicles
hydrogen absorbing alloys
indexing languages
information superhighway
image formation
image fusion
intellectual property
institutional Investors
insider trading
interactive marketing
internal auditing
international securities
immunotoxicity
inflatable restraint systems
international markets
international finance
interlaminar stresses
ionic contamination
knowledge base training
Lan technology
laser diagnostic equipment
leadership development
legal support
leisure time
library management
long term care management
long shelf life
long term storage
low earth orbit satellites
long shelf life
lithium ion batteries
low melting point
macroevaluations
microevaluations
mainframe computing
manufacturing automation
marine technology
marketing intelligence
marketing management
marketing research

marketing tools
meat processing
metals industry
medical recovery
metal semiconductors
field effect transistors
mehanol fuel cells
maximum likelihood sequence estimator
medical imaging systems
microlaser rangefinders
microelectromechanical systems
microencapsulants
microoptics
microspheres
mischmetals
money laundering
money management
multimedia business
multimedia industry
multinational environment
mortgage banking
free trade agreement
mobile communication networks
mixed signal integrated circuits
moisture corrosion
moisture degradation
combat casualty monitoring
motion detection
motion sensors
multinational organizations
multichip modules
multimission combat vehicles
multipath fading
multiple target tracking
multi-resolution monitors
need assessments
nano-materials
natural language processing
neural control nets
neuro-toxicity
non-crystalline films
noninvasive sensors
nondestructive evaluations
nondestructive inspection
nonlinear control systems
nuclear material processing
object orientated programming
object orientated design

obscurants
occupational hazards
occupational health and safety
off road vehicles
oil and gas exploration
oil marketing
oil spill intelligence network
online libraries
online products
open system communications
organizational dynamics
open system architecture
operational architecture
optical fibers
optical interconnectors
optical microprocessors
optically controlled arrays
organic matrix composites
osmotic changes
ozone depletion
Pacific Rim countries
patent trademark laws
patent appeals
patent designs
patient care
patient care information systems
pediatrics
pension management
pension investments
pension benefits
pest control technology
pharmaceutical manufacturing
pharmaceutical industry
pipeline construction
plant engineering
plastics technology
plastics industry
political risk
political finance
process engineering
product alert
product liability
project management
property management
proprietary systems
public broadcasting systems
public health service
public laws

public opinion polls
public relations
public roads
public works
parafoils
paper industry
parametric difference waves
passive moving target indicators
photon batteries
penetration mechanics
Physiological monitoring
physiological recording systems
physiological sensors
plasmodium faciparum
plastic encapsulated microcircuits
polarmetrics
polarization couplings
polymer electrolytes
power management
power output profiles
power spectrum analysis
pressed powder techniques
producibility
production tooling
protein stability
pulse tubes
quality of life
quantum wells
quantum wires
rapid diagnosis
rapid multiplex lasers
raster conversions
real time signal processing
real estate finance
recyclable material
rechargeable batteries
recombinant proteins
recombinant toxins
remote warfare operations
rendering facilities
retail banking
retiree benefits
risk management
reproductive toxicity
residual life indicators
robust control systems
rotorcraft gearboxes
scene generation

selective dissemination
semiconductor industry
situational analysis
small business set asides
small computer interface systems
social security administration
software market
software industry
solar energy technology
superfund
surface mining
surface mining control
surface mining reclamation
surface modification technology
solid state technology
scene projection
seeback coefficient
sensor fusion
situational awareness
small unit operations
smart actuators
smart fluids
smart materials
smart structures
software testing
spectral analysis
speech enhancement
speech generation
speech intelligibility
speech synthesis
standoff chemical agent detectors
stiffness
stitchless
superlattice
superconducting electronics
superconducting materials
situational awareness
surfactants
switching speeds
synthetic environments
synthetic scene generation
system evaluations
tactical engagement simulation
target marketing
technology insertion
telemaintenance
telemedicine
temperature migration

terrain reasoning
test kits
thermoforms
thermophotovoltaic energy conversion
Transition Industries
user system interfaces
vehicle antitheft devices
vehicle wireless tracking devices
video capture
video compression
viral deactivation
virtual environment
weapon stabilization
weapon systems technology
wireless modems
wireless video transceivers
white light interferometry
work measurement
vehicle dynamics
strategic review
strategic management
strategic evaluation
global competition
foreign cultures
environmental audits
joint venture
entertainment industry
Ultrahigh definition television
satellite television networks
world bank
home satellite dish antennas
domestic pay television
overseas investments
trade deficits
computer industry
competitive advantage
banking industry
retailing industry
nonprofit organizations
small business enterprises
recreation industry
material handling engineering
contingency planning
computer information systems
resource allocations
conflict management
change management
environmental management

work life
home life
corporate fitness programs
strategic business units
financial ratios
customer analysis
marketing research
social responsibility
competitive profile matrix
competitive analysis
business ethics
long term objectives
globalization
Political reforms
operating profits
market shares
early retirement
post employment benefits
accounting changes
post retirement benefits
technology base
customer focused R&D
customer focus
innovation management
cross functional teams
software industry
software development
government regulations
technology needs
technological opportunities
environmental constraints
material shortages
process cost reductions
technological advantages
technological collaboration
research technology management
business relationships
customer relationships
micromanagement
manufacturing technology transfers
research performance evaluation
productivity management
technology innovations
personnel appraisals
product quality
competitive analysis
technology base
exploratory development

technology transition
return on investment
technical feasibility
employee empowerment
performance appraisals
customer contact
patent recognition
team recognition
group training
off-site meetings
financial achievement awards
productivity measurements
work breakdown structure
customer focused assessments
project assessment
technological requirements
budgetary constraints
software engineering processes
process improvements
product idea generation
product benchmarking
process benchmarking
customer requirements
customer assistance
customer involvement
manufacturing engineering
technology acceptance
multifunctional teams
strategic partnering
strategic partnership
product specifications
commercial needs
commercial applications
material processing
diverging product specifications
common technology base
design engineering
technology assessment
natural disruptive events
technological areas of influence
demographic developments
societal values
consistency analysis
consistency matrix
scenario development
differentiation strategies
diversification strategies
technology acceptance

population mobility
mortgage interest rates
scenario application
technology innovations
innovation management
business operation maintenance
latent customer needs
innovation climate
competitive strategy
profit growth
value creation
resource accesses
strategic direction
core skills
corporate vision
organizational structure
technological exploration
technological capability
technological time horizon
critical success factors
innovation scope
innovation longevity
venture capital investment
technical research liaison
technology acquisition
strategic acquisition
adult education
automatic target monitoring
bulk crystal nitrides
carbon monofluorides
causeway ferries
process certification
code analysis
combat casualty care units
cost benefit analysis
cryoelectronics
degradable materials
digital cameras
distributed cooling elements
electronic materials
environmentally safe procedures
ergonomics
fishing and recreational vessels
forward observers
fuzzy neurals
gallium nitrides
gimbal systems
guided ordnance

hazard material handling
high temperature superconductors
high performance data networks
image analysis
image fusion
indium nitrides
intelligent tutoring systems
literacy
littoral warfare simulation
low cost fiber optics
mission critical success factors
mitigating circumstances
multichip modules
multispectral object detection
nitride source materials
offshore construction
optical backplanes
optical interference
outboard motors
real time communication displays
real time imaging
relative positioning
remotely operated vehicles
reprogrammable electronic devices
ruggedized camera components
safety critical design
satellite based tracking
sea based logistics
selective cargo offloading
ship motion forecasting
ship surfaces
shipboard cargo handling
signature control mechanisms
single crystal growth
solar blinds
sound velocity profiles
space environmental sensing
structural health monitoring
substance abuse
trauma care units
computerized tutoring systems
ultrasonic imaging
vapor phase corrosion inhibitors
volatile corrosion inhibitors
wave motions
weapon spotting
wideband signatures
wide gap semiconductors

four dimensional instrumentation
space environmental sensing
lightweight satellite sensors
single crystal piezoelectrics
laser velocity sensors
ultrasonic diagnostics
imaging transducers
self assembly monolayer technology
computer based training
unattended video surveillance
urban environments
strategic mobile targets
multispectral sensor fusion
biologically motivated neural processing
remotely piloted undersea vehicles
kinematic global positioning systems
real time fault detection
emissivity control surfaces
fiber optic sensors
anamorphic lens
high speed optical links
floating platform cranes
radiofrequency identification systems
inflatable boat propulsion systems
space based logistics tracking
disposable food service utensils
team process analysis
team task analysis
multi-team tasking
high energy density batteries
distributed surveillance systems
asynchronous transmission mode
remote machinery conditioning monitoring
frequency adaptive electronics
energy harvesting
nanoelectronic architectures
carbon nanotubes
nanoscale lithography
microstructure fabrication processes
optical memory access
all source region monitoring
security self checking tools
image quality assessment
vehicle motion analysis
open architecture security tools
network performance diagnosis
accelerated network protocols
mobile oceanographic sensors

microelectromechanical sensors
robotic ground vehicles
image quality assessment
portable smoke generators
deep buried target detection
external zip drives
analog voice modems
removable hard drives
high speed pentium processors
ultralight notebook computers
flat panel display systems
pci local bus video
handheld personal computers
digital photography
National Defense Authorization Act
Acquisition workforce
Acquisition Reform
Reduced cycle time
infrastructure
systems development process
commercial business environment
prime vendors
virtual prime vendors
competitive sources
leading edge technology
critical information technology
emerging technologies
joint warfighting
performance benefits
joint architecture design
reduced infrastructure costs
cross-service capabilities
worldwide competition
government held wholesale stock
material support centers
best business practices
Distribution Standard Systems
logistics processes
retail stock inventories
best commercial practices
inventory consignment
Time Definite Delivery
replenishment cycle times
operations and support costs
life cycle logistics support
commercial item inventory
competitive market forces
rule-based thinking

distributed learning
acquisition process improvements

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Glossary

- AD** - Accession Documents-identifies technical reports in DTIC
- ADD-** Automatic Document Distribution-Profiles established by users indicating their interest in receiving microfiche of newly acquired technical reports.
- Asterisk Terms-** Terms identifying major topical relevancy
- Automatic Indexing-** Computer indexing without human review
- Boolean Logic-** Boolean functions: And, Or, and Not used as Search functions
- COSATI-** Committee On Scientific And Technical Information
- Constraints-** Bounds or limits established through the definition of system performance features and can be described in terms of tradeoff areas
- Controlled Vocabulary-** Words used as authorized posting terms
- Controlled Identifiers-** Wording that always restricted to one type of entry
- CAB-** Current Awareness Bibliographies
- Database Cleanup-** Removing extraneous terms from database
- Descriptors-** Conceptualized index terms
- DoD-** Department of Defense
- DoD Instruction 3200.12-** Institutes and delineates responsibility for DoD Scientific and Technical Information Program
- Document "Aboutness"-** Indexable content representing important document aspects
- DRIT-** DTIC Retrieval and Indexing Terminology replaced by the DTIC Thesaurus
- DTIC-** Defense Technical Information Center
- DURS-** Defense Users Registration System

EDMS- Electronic Document Management System

Fields and Groups- DTIC subject categorization scheme that presently consist of 25 broad subject fields and 261 groups(sub-fields)

Generic Terms- General terminology not associated with any particular field

GUI- Graphic User Interface technology in use at DTIC

Lexical Dictionary- Computer resident dictionary of thesaurus terms with reference and lookup tables

MAI- Machine Aided Indexing

MAR- Machine Aided Retrieval

MCTL- Military Critical Technology List

Meta Rules- Rules concluded from generalized usages

Microthesaurus- Thesaurus entries that include domain, sub-language, associate and generic terms

Multi-disciplined Database- Comprised of data from several scientific and technical areas

NISO- National Information Standards Organization

ODAL- Online Dissemination Authority List

Phrase selection Routine- MAI grammar based sub-routine

Recognition Dictionary- A lookup table of comparative and associative database terms

S & T Codes- Scientific and Technical Area codes

STIP- Scientific and Technical Information Program

Sub-language- Language used in a restricted or specialized domain, i.e., Bioscience

SWOT Analysis- A strategy formulation process that uses an organization's strength and weaknesses to take advantage of opportunities and counter-act

threats

Technology Codes- Coding designations identifying critical technology areas assigned by the responsible Technology Working Group(TWG)

Text Searching- computerized term-searching in document text

Variant terms- Homographs and variations in spelling or languages

WUIS- Work Unit Information Systems re-designated TEAMS 1998.